REPORT

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THE undersigned, acting as a committee of the Graduate School, have read the accompanying thesis submitted by Miss Belle May Comstock for the degree of Master of Arts. They approve it as a thesis meeting the requirements of the Graduate School of the University of Minnesota, and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts.

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The Lucretian Theory of the Soul

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A THESIS

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Belle M. Comstock

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Introduction

Epicurean philosophy is practical, not theoretical; it is concerned with life rather than with pure science. Its chief aim is the promotion of "happiness" and the means to this is the intellectual and moral emancipation of the race.

While the subject matter of the poem "On Nature" is apparently of a scientific and materialistic rather than of an ethical and spiritual nature, the impelling motive of the entire work is the desire to purify the human heart and to enable man to live in tranquillity of spirit.

According to Lucretius, the principal cause for disquietude is superstitious fear arising from ignorance of the world about us and of the constitution of our own sould. Inability to explain the physical universe has caused men to forge for themselves and their posterity the shackles of superstition by ascribing marvellous

powers to the gods; lack of knowledge of the soul has led men to entertain various terrifying views, of which one of the most pernicious is the belief in a future life. By giving a purely scientific exposition of the laws of Nature, Lucretius hopes to liberate mankind from fear of the gods and from apprehensions of future punishment. Only when thus emancipated can man devote himself with singleness of purpose to the achievement of the highest good.

Of the three branches of the Epicurean Physics, Psychology is the most important. As far as ethical purpose is concerned, the "De Rerum Natura" reaches its culmination in the exposition of the nature of the soul and the proof of its non-existence after death. However, since the atomic theory not only fulfils in a measure the purpose of the poem, by demonstrating that Nature does all things without the intervention of the gods, but also is a necessary introduction to a materialistic conception of the psychic life, the main principles

of the atomic theory will be included in the treatment of the Lucretian Theory of the Soul.

I. History of the Atomic Theory.

In the very beginnings of philosophy, men sought to discover the nature of the material universe and to bring unity out of diversity. Is matter one thing or many? Is it continuous or discrete? In the attempt to answer these questions, thought flies beyond the boundaries of experience to bring back at times truly helpful tidings, even as Lucretius says his master passed beyond the "flaming walls of the world" to discover the laws of nature.

One of these early excursions into the unknown resulted in a theory which was destined to be of tremendous importance in the light of subsequent history. This was the atomic theory.

According to Aristotle and Theophrastus, Leucippus was its originator.[1] The theory was a logical development of the beliefs of the Eleatic school of which Leucippus is thought to have been a student.

1. Burnet, "Early Greek Philosophy" 351-2

In opposition to the Eleatics who taught the unity and immovability of the One, thus denying the existence of void and the reality of motion or any sort of physical change, Leucippus introduced the idea that the Void is as real as Matter and that the two must exist intermingled throughout the universe. In other words, for the One of the Eleatics, was substituted an infinite number of small indivisible bodies, each of them a sort of Parmenidean sphere on a small scale, which move in the Void. In the combinations and separations of these bodies consisted all the changes that occur in nature.

This theory reached a more complete stage of developement with Democritus, the date of whose death is placed at about 360 B.C. Anaxagoras had previously taught the existence of mind as a final cause and also the doctrine of the similarity of parts. His teachings may have influenced the atomist to define his position more exactly.[1] However that may be, Democritus conceived of the atoms as eternal and therefore without cause, and ascribed to them inherent motion. Furthermore he taught

1. Brett, "The Philosophy of Gassendi," XXI.

that all the matter of the universe is simple and homogeneous in substance.

Nearly a century later, the theory was expanded and in some respects corrected by Epicurus to be used as the physical basis of a system of ethics. The differences between the theories of the two philosophers are as follows: Democritus taught that the number of shapes of atoms is infinite; Epicurus that the number of shapes is finite, but that the number of atoms of each shape is infinite; Democritus believed that the atoms have no parts; Epicurus that though indivisible, they have parts; Democritus thought that in the eternal fall through infinite space, the heavier atoms strike against the lighter and that by these collisions worlds are formed; Epicurus accepted the objection of Aristotle that bodies of unequal weight fall with equal velocity in a vacuum, and had recourse to the expedient of atomic declination to bring about aggregations of atoms.

The developments and divergences, which mark the transition from a theory of atoms to Epicurean philosophy,

are summed up as follows by Professor Brett:[1] "Leucippus had given only a slender vein of cosmological reasoning; Democritus extended the theory to psychology of a sort with an appendix of ethics; Epicurus made ethics the prime end and aim of the philosophical treatment of the world and atomism was taken as its guiding principle."

A study of the teachings of Epicurus, as recorded by Diogenes Laertius, proves that Epicurus aimed at no very exact theory of knowledge. Zeller indeed places the intellectual value of Epicureanism at the lowest level. While Epicurus despised learning and culture, he attached much importance to the study of nature, not for the sake of science but for practical purposes. It was truly fortunate for the modern world that when Epicurus was in search of a means for dispelling the terrors engendered by the fear of God and the thoughts of death, he chose the atomic hypothesis of Leucippus and Democritus. It was perhaps just as fortunate that Epicureanism found in Lucretius a disciple capable of transmitting this doctrine in an attractive form.

1. "The Philosophy of Gassendi," XXIV.

We may read Lucretius for his poetic qualities, but we cannot dissociate him from the scientific side of his work. Hence it may be well to trace briefly his influence in the realm of science.

Epicureanism survived the introduction of Christianity by about four hundred years and then practically disappeared as far as its teachings on natural philosophy were concerned. Incredulity was perhaps the predominating characteristic of the Epicurean. He denied miracle and eliminated religion from his scientific beliefs.[1] If one considers this fact together with the opposition of the Stoics, it is not strange that the term 'Epicurean' acquired an evil significance and that the adherents of this school received a generous share of the maledictions of the Fathers. However at the Renaissance, when Europe began the revolt against authority, the ideas of Epicurus were again treated with respect, but it was not until the seventeenth century that the atomistic hypothesis received any serious consideration.

1. J. M. Guyan, "La Morale d'Épicure," 190.

Pierre Gassendi, who revived Epicureanism, was, strange to say, a man of the Church. Born in 1592 near Digne in Provence, a lecturer at the College of Digne while still a mere youth, a Doctor of Theology at twenty-four, and an untiring student and thinker to the end of his life;-this in brief outline was the career of Gassendi. In his day, the philosophy of Aristotle completely dominated the thought of Europe and scholastic quibblings were occupying the place of real investigation. Gassendi was thoroughly trained in practically all the learning of his time, including mathematics, physics, biology, and medicine. This extensive learning enabled him to apply constructive criticism to philosophy. It was the content of the universe as a whole that received his attention. Professor Brett says, "From its relation to the investigation of nature in modern times, Gassendi's revival of Epicureanism is of far greater historical importance than the renewal of any other system." 1

1. "The Philosophy of Gassendi," 248.

The portion of his work of immediate interest to us is his influence on the reformation of physics by the revival of the atomic theory. Granted that atoms were once in existence, Gassendi's conception of them was practically that of Epicurus. He ascribed to the atom, magnitude, figure, weight and least parts. The especial difficulty lay in the reconciliation of science with theology, so Gassendi made room for the work of God by denying that atoms were uncreated. He maintained that the atoms were self-moving 'Dei gratia.' In other words, at the beginning God created matter, set the atoms in motion, and prescribed the line of development to be followed. So Masson points out, the existence of law and order in the universe proved to Gassendi the existence of a God as to Lucretius it proved the opposite.[1]

A mighty impetus toward the persistence of the atomic theory was afforded by its adoption by Sir Isaac Newton. We can trace the 'solid, massy, hard, impenetrable, movable particles' of Newton back to the teachings

1. "Lucretius, Epicurean and Poet," Complementary Vol., P.43.

of Leucippus. "The turning point in physical philosophy," says Professor F. W. Clarke,"is Newton's discovery of gravitation, for that indicated mass as the fundamental property of matter. For any given portion of matter which we can segregate and identify, extension is variable and mass is constant: when that conclusion was established, the dominance of atomism became inevitable."[1]

The modern theory of atoms as worked out by Dalton is historically the Greek theory but with a very important difference. Thus far, differences of atomic structure and arrangement of a simple form of matter were thought to account for all chemical transformations. This was true until Boyle originated the hypothesis of different elements. In his 'Sceptical Chymist', he gave the first scientific definition of an element as a substance which could not be decomposed. The work of his successors, Lavoisier in particular, gradually established in the minds of chemists that there existed a series of elements not convertible into one another. It was to that series that Dalton applied his atomic

1 ."The Atomic Theory," Science Vol., 18, n.s. p.516.

hypothesis. The original element in his work was the conclusion that atoms were not of all kinds of shapes, but that the atoms of the same element were all identical in weight while the atoms of different elements were different in weight. The earlier atomic speculations had been qualitative, but now Chemistry was given an absolutely quantitative basis; for indefinite combinations, definite proportions were substituted.

From the time of Dalton, the atomic theory followed two distinct lines of development, one in chemistry, the other in physics. Early in the nineteenth century, Avogadro distinguished clearly between atoms and molecules, although the theory was not accepted for nearly fifty years.

Recently Sir William Ramsay said: "Till a few years ago it was believed on indirect evidence that everything was composed of atoms; now we know it to be so."[1] This certainty he explains as the result of the discovery of radio-active elements by the French physicists Becquerel and Professor and Madame Curie.

1. "Atoms," Harper's, Vol., 27, p. 363.

Subsequent experiments in this field have led to the isolation of the atom and the test of its size by Professor Ernest Rutherford of Manchester University, and we are told that Sir Joseph Thomson has devised a method of photographing atoms. One hundred years after the adoption of the atomic theory, science demonstrated that the atomic unit is made up of smaller units or electrons. The theory of electrons does not set aside the atom but goes beyond it. The atom is still recognized as a necessary step in the hypothesis.

Authorities in the scientific realm concede that it was the atomic theory that made possible the development of chemistry and physics. Of such importance was the idea of atoms hypothesized by Leucippus and Democritus.

II. _The_Lucretian_Atom.

At the beginning of his poem, Lucretius establishes a scientific basis for his discussion by the enunciation of the principle of Law in Nature. Epicurus, he tells us, passed beyond the "flaming walls of the world" and traversed the immense All with the power of his intellect, thence he returns as victor to report what can and what cannot come into being, and finally in what way each thing's power is limited and has its deep fixed boundary mark."

The first specific application of this principle is the statement that "Nothing is ever created from nothing by Divine power." [1] Here the poet is not only setting forth a principle of science, but reveals himself engaged, like the Titans of old, in a deadly struggle with the gods. Men thought that every phenomenon beyond their comprehension occurred through the agency of the gods, an agency that all too often was not of a beneficent character.[2] Hence in proving

1. I. 150 2. I. 151-4.

that every occurrence in nature is the result of an antecedent cause, Lucretius is eliminating the gods as a disturbing element in the universe. He is apparently too completely a materialist to think of the Deity as a possible source of laws, for his gods are merely a highly refined manifestation of matter and the divinities of popular conception, anything but a personification or source of law.

The existence and operation of law in nature accepted, Lucretius discusses the constitution of the universe.

He asserts that everything in nature is made up of first, matter which fills space and secondly, empty space itself, both of which are infinite. Matter must be divided by void, but if this division were continued to infinity, matter would be reduced to no magnitude and would therefore be destroyed. Hence it is necessary to assume a smallest portion of matter beyond which actual further division would be impossible. This is the atom of Leucippus and Democritus, exactly

defined by the words "nec findi in bina secando." [1] To provide for the further conceivable mental division of the physically indivisible particles, Epicurus ascribes to the atoms "least parts" which will be discussed below.

These minute, hard, indivisible bodies, Lucretius calls by various names such as materies, matter, semina rerum, seeds of things, genitalia corpora creative bodies, primordia and solida primordia simplicitate primal elements of solid singleness.

These atoms are uncreated and eternal. If once the power of God is eliminated, as is done by Lucretius, it is impossible to conceive of anything antecedent to the primal elements themselves. Being the smallest possible divisions of matter, they contain no void and as a result are impervious to any destructive influence such as heat, cold, moisture, and they cannot be crushed. The absolute solidity of the atoms is mentioned again and again. Lucretius thinks of the atoms as constantly acted upon by the blows of other

1. I. 533.

atoms but, in spite of the incessant buffeting, they remain absolutely unchanged throughout all eternity. In its hardness, the Lucretian atom differs from that of modern science which conceives of the atom as owing its mass perhaps merely to electrical changes in extremely rapid motion.[1] Furthermore, Lucretius assumes the atoms to be elastic.

In regard to their substance, the atoms are homogeneous; therefore to provide for the multiplicity of things, the atoms must have qualitative differences ascribed to them. These qualities are magnitude, weight, and shape. In addition, by reason of arrangement, the atoms may bear to each other various relations in space.

Inasmuch as the characteristics of the atoms are of the utmost importance in Epicurean psychology, it may be well to discuss them at some length.

In size the atom lies far beneath our perception;[2] but it is not infinitely small. The theory of images throws some light on Lucretius's conception of the size

1. Bigdon, "Theoretical and Practical Chemistry," 132.
2. II, 312-3; IV, 112-3; I. 268 - 70.

of atoms. Every object continually gives off in all directions films of atomic composition, but the objects suffer no apparent loss.[1] These films stimulate the eyes to see, but how much finer must be the atoms of those films which are perceptible only to the eye of the soul! Furthermore how minute must be the soul atoms of an almost microscopic animal! However without doubt modern science has demonstrated the atom to be much smaller than Lucretius thought it to be.

The weight of the atoms must be proportionate to their size since matter is homogeneous and the first bodies contain no void.

A further distinction between atoms is difference of shape. According to Lucretius, the number of shapes is finite,[2] although the number of atoms of each shape is infinite.[3] The difference of shape is thought to be due to differing arrangements of the least parts. Among atoms of the same shape, there may be differences of size, and of atoms of the same general contour, some may be smoother than others.[4]

1. IV. 42 - 128. 2. II. 479 - 80. 3. II. 523 - 5.
4. II. 381 - 7. II. 469.

It is indeed the shape of the component atoms that determines the properties of any substance[1]. Solids are made up of compacted, hooked, and branching atoms which cohere very closely; liquids of smooth and round atoms that do not repel each other and at the same time permit freedom of movement; flames and gases of sharp cornered, not closely united atoms. This explanation of the relation of the molecules of solids, of liquids and of gases is, if we disregard the shape, not unlike the modern theory. Light is composed of small atoms; hence its power of penetration. Sluggish liquids are made up of large or hooked atoms that impede each other.

The three above mentioned characteristics, size, weight, and shape, are the only qualities of sensible objects that Democritus and his successors ascribe to the atom. Everything else exists only in opinion.[2] The absence of secondary qualities in atoms, Zeller sums up as follows: "To the primitive bodies themselves, the atoms, we must not ascribe any of those particular qualities, but merely those without which an existence

1. II. 444, fl.

2. Diogenes Laertius, "Lives of Eminent Philosophers," Democritus, XII.

or a body would not be thinkable."

The atoms have no color; the color of sensible objects depends upon the combination of atoms.[1] Neither are the primal elements possessed of heat; the sensations of heat and cold are caused by atoms of certain shapes.[2] They are devoid of sound, moisture, or odor. They are neither pliant, frangible, nor hollow, for these conditions would render matter susceptible to dissolution, but the atom is always "solidā simplicitate." [3]

With one simple, basic substance, all qualities of things must be the result of the shape, size, and relation in space of the atoms of which they are composed, and all changes including life and death must be due to an altered combination of atoms. Lucretius states this idea repeatedly. "You may rather postulate certain atoms endowed with such a nature that, if they happen to produce fire, they will be able, when a few have been removed and a few added and their arrangement amd motion altered, to constitute air." [4]

1. II. 757, fl. 2. II. 431 - 3. 3. II. 842 - 64.
4. I. 798 - 803.

Again, after speaking of the various combinations of the same letters to form words, Lucretius says:

"So much are the letters able to accomplish merely by a change of arrangement, but the primal elements are able to admit of more combinations whence each several thing is created."[1]

"This proposition," says Lange, "that atoms have no qualities except figure, size, and weight, which formally denies the existence of intrinsic qualities as opposed to external motions and combinations, forms one of the characteristic features of all Materialism. With the assumption of intrinsic qualities the atom has become a monad and we pass on to Idealism or Pantheistic Naturalism."[2]

1. I. 827 - 9.

2. "History of Materialism," Vol. II.

III. The Kinetics of the Atom.

With the exposition of the qualities of the atoms, only half of Lucretius's explanation of the phenomena of the universe is completed. Indeed the existence of what we call the world and all that it contains, from aggregations of gross matter to the subtle fabric of the mind, depends upon the movements of the atoms and their resulting relations in space.

The first statement in regard to kinetics is that "matter does not cohere inseparably massed together."[1] This condition is made possible by the existence of void.[2] The belief in the motion of the primal elements, Lucretius derives from the constant mutations occurring before his very eyes,- mutations which, he infers, must occur throughout the universe. In fact, he regards the motion of the atoms as the ultimate form of the energy of the universe.

Furthermore, the atoms never stop.[3] Two motions are ascribed to them, the one downward in virtue of

1, II, 67 - 8. 2, I, 329 - 30.

3, II, 95 - 6, 297 - 9.

gravitation, and the other, the result of the shocks received from other atoms.[1] This second atomic motion, due to a rebound after collision, presents a serious difficulty. Lucretius says, "For in every case when the moving atoms meet and clash, the result is that they suddenly leap apart in opposite directions; and this is not strange since they are very hard and of solid mass and there is nothing behind to stop them."[2]

However, perfectly hard and solid atoms could not rebound. The ability to rebound depends upon the distortion that a body undergoes when it is subjected to stress, but atoms of perfect hardness and solidity would suffer no deformation when struck and therefore could not behave as though elastic. After collision they would cling to each other and move onward together. Furthermore, during the instant of collision or immediately following it, the energy of motion in a perfectly solid body could not be converted into heat or vibration or any other form of energy.[3] However, it may be possible that Lucretius's idea of solidity

1, 83 - 5. 2, II, 85 - 8.

3, Masson's "Lucretius Epicurean and Poet," 119.

differs from the conception of modern physicists and that in his description of the atom, he is struggling with the inadequacy of the Latin in the realm of scientific terms.

Moreover, not only are the atoms in the midspaces of the worlds in motion, but also those which are combined in substances of apparently stable composition.

The atoms which, after collision rebound so as to leave small spaces between them, form substances like iron or rock, while those that rebound through a longer path form gases.[1] There is conclusive evidence that Lucretius thinks of the atoms in combination as moving and still retaining their initial velocity. For example, he says, "It makes a great difference with what atoms and in what arrangement the primal elements are held together and what motions they mutually give and receive." [2]Another passage proves that the atomic motion continues when the atoms are combined: "The atoms of all things flit about sua sponte driven on

1. II, 100 - 7. 2. I, 817 - 9.

by eternal motion." 2 The words suā sponte apparently mean that the motion or rather the ultimate cause of motion, is inherent in the atoms and not derived from a divine source. Epicurus also teaches that the atoms of compound substances are all moving at the same rate of speed. 3The only difference in the motion of the atoms that form rock and of those that form air is that the former rebound through a shorter distance and hence must describe the pa th of vibration more frequently, while the atoms of a gas describe a longer path, but less frequently.

Lucretius very frequently treats of the atoms as though they were molecules. Nowhere does he make the distinction although he hints at an idea similar to the molecule in one passage where he speaks of the particles of heat as gathered together in globular masses in contradistinction to individual atoms. 4 The especial difficulty arising from this confusion is in its bearing upon the kinetics of the atom. Lucretius tells us that all atoms move with the same rapidity, but in numerous passages he speaks of certain atoms as more mobile than

2. III, 31 - 3. 3. Diogenes Laertius X, 24.
4. II, 153 - 4.

others. For instance, water passes through a colander very quickly while sluggish oil is slow to do so because the oil is composed either of larger atoms or of those that have more hooks. [1]Again, honey flows more slowly than water because the latter consists of smaller, rounder, and smoother atoms which are therefore more easily moved.[2] Moreover the various ingredients of the soul differ in mobility according to the size of their first beginnings.[3] Indeed upon this theory is built the whole explanation of the operations of the soul. Lucretius perhaps means that the molecules of these various substances differ in size, coherence, and velocity.

The speed of the atoms, Lucretius considers to be enormous, in fact much greater than what he conceives to be the velocity of light.[4]

This theory of the motion of the ultimate particles of matter is now accepted by scientists as correct, and the velocity of the molecules of various substances has been measured.

1. III, 186 - 95. 2. III, 195. 3. III, 205.
4. II, 150 - 63.

After describing the motions of the atoms, Lucretius explains how sensible objects are enabled to move. He speaks first of the motes dancing in the sunbeams and then proceeds thus: "Doubtless all bodies have this motion from the atoms. For the atoms move of their own inherent force; then those bodies which consist of small aggregations and which are as it were nearest to the force of the atoms, are set in motion by the unseen blows of these (atoms) and they in turn move those (combinations) that are a little larger. Thus motion mounts upward from the primal elements and comes gradually to our perception so that those things are likewise moved which we are able to see in the light of the sun, but by what blows they accomplish this is not apparent."[1]

This probably should not be construed to mean that when a small body passes on its movement to a heavier one, there is a multiplication of the mechanical energy expended, for Lucretius teaches that the sum of the energy of the universe does not change. A small

1. II, 132 - 41.

body in rapid motion could produce a slower movement in a heavier body and this a yet slower movement in a still heavier body. Inasmuch as the movements of visible objects are very slow in comparison with the enormous velocity of the atoms, the theory appears reasonable.

Having given an exposition of the kinetics of the atom, correct in its main features, Lucretius introduces a theory wherein his ethical system secures the ascendancy over his scientific knowledge. This is the theory of Declination, a device useful not only to account for the formation of the world, but also to explain the existence of Free-Will in man.

Lucretius explains the nature of Declination as follows: "When the atoms are carried straight downward through the void by reason of their own weight, at a quite uncertain time and in quite uncertain places, they push aside a little, only enough so that you may say that the impulse has changed. If they were not accustomed to swerve they would all fall downward like drops of rain through the immense void, no clashing

would have taken place and no collisions would have been caused for the primal elements: so nature would never have created anything."[1]

This theory is peculiar to the physics of Epicurus. Democritus, conceiving of the atoms as streaming "down" space in parallel lines, explained the formation of worlds by the assumption that the heavier atoms would fall more rapidly than the lighter ones and hence would overtake the latter, thereby causing collisions. Epicurus however, accepted the objection of Aristotle that bodies of unequal weight would fall with equal velocity in a vacuum since void could offer no resistance.[2] Atoms thus falling through space would be at rest with reference to each other, would be no source of power, and never could form any sort of aggregations. The theory of declination enables the atoms to clash, exert all their force upon each other, and, out of the infinity of collisions, to form the nuclei of worlds.

This theory is regarded as one of the dis-

1. II, 217 - 24. 2. II, 225 - 42.

tinguishing features of Epicureanism, but there are perhaps few that present a greater number of difficulties.

In the first place, one must consider the statement that the atoms move downward through space. M. Guyau explains that up and down are with Epicurus conventional terms which designate the two opposite directions in infinite space.[1] The fallacy however lies in the hypothesis that attributes to original motion only two possible directions. A knowledge of the law that every particle of matter in the universe attracts every other with a force directly proportional to the product of their masses and inversely to the square of the distance, would have vastly simplified the problem. But if one considers the conditions as Epicurus understood them, he seems to have chosen a simple and effective device.

Declination makes possible the explanation not only of the formation of the world, but also of the existence of Free-Will in man.[2] It may not be an exaggeration to state that the latter function is considered the more important of the two since psychology

1. "La Morale d' Épicure," 73. 2. II, 251 - 93.

is the most important branch of physics in the estimation of the Epicureans. With them, the mind is not the power ~~of~~ over matter, but merely a very perfect form of matter. The action of the mind is formulated in terms of the motion of atoms and consequently, if the atoms of the mind were obliged to follow the inexorable laws of mechanics, man would be the slave of Necessity. By allowing the atoms to swerve the least bit, the Epicureans enable man to exert control over his own acts.

Most of the difficulties of the theory of declination must be left for consideration until the Lucretian psychology has been examined. There is one question, however, which may properly be asked here. How is it possible for atoms to swerve at all?

Lucretius insists that the swerve is very slight, 'nec plus quam minimum.'[1] We are not to think of the effect of declination as an oblique motion. On a number of points, where Materialism is weak, the responsibility for the answer to certain questions is shifted so as to make the difficulty as remote as possible. In this instance, by reducing the latitude

1. II, 244 - 5.

of the swerve, Lucretius apparently hopes to avoid a violent conflict with the laws of mechanics and to escape a contradiction of the evidence of sense perception. He says that to an observer bodies seem to fall straight toward the earth, but no one can affirm that they do not swerve at all.[1]

Science helps somewhat in answering the question of the possibility of the swerve. Professor Jenkin applies in this connection the principle of mechanics that a force acting at right angles to the direction in which a body is moving, does no work although it may continually alter the direction in which the body moves.[3] No expenditure of energy, then, would be required to cause the deflection. Yet the difficulty is not removed.

It has been stated that the only ultimate form of energy recognized by Lucretius is the atoms in motion and we have seen how declination rendered the atoms, originally in a state of rest with reference to each other, the source of this power.

1. II, 246 - 250.

3. Masson, "Lucretius Epicurean and Poet," p. 134.

The last important proposition regarding the kinetics is that this energy once developed is constant. Lucretius says, "For the supply of matter ------ has neither received any addition nor suffered any loss. For this reason, the atoms were in time gone by in the same motion as they now are, and hereafter in a similar manner they will be borne on eternally." [1]

Furthermore he argues that since the universe is infinite, 'no power can alter the sum of things.' [2] In other words, since neither atoms nor their motion can be created, altered, or destroyed, the entire amount of energy in the universe must remain the same. This is a foreshadowing of the doctrine of the Conservation of Energy. Perhaps the most apparent difference between the belief of Lucretius and that of modern physicists lies in the fact that the former does not recognize the transmutation of the energy of motion into that of heat, or electricity or any other manifestation.

The main principles of the atomic theory of

1. II, 296 - 9. 2. II, 303.

Lucretius have now been traced. His entire system of physics reaches its culmination in the exposition of the nature of the Soul.

IV. The Lucretian Theory of Life.

In the Epicurean philosophy, life and sensation are inseparable and the term 'Soul', as employed by Lucretius, covers both the vital principle and the vehicle of consciousness. Hence any treatment of the Epicurean psychology must involve the theory of life.

First of all, the existence of Life presupposes an organic whole, a principle which, by the side of the atoms and the void, is something wholly new. This fact Lucretius does not recognize. He admits of only two fundamental entities, stating his belief in the following words:[1]

"Besides atoms and void, there can be no third nature in the number of things, either that falls under our perception at any time or that anyone can grasp by process of reasoning." Everything else is either an essential property or an accident of matter and void.[2] Thus according to Lucretius, Life must be an incidental

1. I, 445 - 8. 2. 449 - 50.

aspect involved in the flux of matter. Hence it is not surprising that his explanation of Life is essentially identical with that of color, hardness, shape, or any other accident.

Such a theory is the logical result of a materialistic conception of the universe, but the difficulties involved in the exclusion of any third principle are insurmountable.

Lucretius's fundamental position is that the sentient is developed out of the non-sentient.[1] He gives an elaborate proof that the atoms are utterly dead and indeed devoid of most of the qualities of sensible objects. If the sentient comes only from the sentient, the primal elements must be mortal like the whole animal, but the first beginnings are eternal.[2] As a climax to his argument, Lucretius indulges in a reductio ad absurdum, saying that we should find the atoms laughing and weeping, and instituting philosophical discussions concerning their own composition if they were sensate.[3]

1. II, 865 - 7. 2. II, 902 - 6. 3. II, 973-90.

In substantiation of his position, Lucretius brings forward what he considers conclusive proof. Worms are produced from filth when it is disintegrated by the rains; waters, leaves and pastures change into flocks; Nature converts food into living bodies; from food she creates all living things (omnes sensus);[1] again eggs produce birds.[2]

All these illustrations are apparently invalid. In the first place, the weight of experimental science all tends to the conclusion that life can be produced only from antecedent life;[3] in the second example, Lucretius leaves out of account the fact that food is changed into living tissue only through the operation of already existing vital processes; and in the last, the germ of life is present.

Having proved to his satisfaction that ~~the~~ living forms can come from dead matter, Lucretius explains that not all atoms are capable of producing life. His statement is as follows:[4]

"It will behoove you to remember ----- that it

1. II, 871 - 80. 2. II, 927.
3. Sir Oliver Lodge, "Life and Matter," p. 171.
4. II, 891 - 6.

makes a great difference first of all, how small those atoms are which create the sentient and with what shape they are endowed, and finally what motions, arrangements, and positions they have." This is the same formula that Lucretius uses to explain the formation of the earth and all that it contains. The significant fact here is the use of the words "how small those atoms are." This expression occurs nowhere else in this connection. From this passage as well as from the treatment of the Soul in Book III, it is evident that only very minute atoms can produce life. On the other hand, when suitable atoms of a certain size and shape are placed in a certain specific spatial relation to others and are endowed with a certain vibration, life must result.

We may ask now, "What is the Lucretian definition of Life?" The first hint at a reply is found where the poet tells us that Nature converts food into living bodies.[1] This implies that life must be a form of material energy. A clearer answer is given in a number of other passages to the effect that Life is a 'mode of

1. II, 879 - 80.

motion of the atoms'.[1] For instance, "By the combined atomic motion (of soul and body) sensation is kindled and blown into flame throughout the frame."[2] Furthermore, a very serious shock confounds the sensations "for the arrangements of the atoms are destroyed and the vital motions are impeded to the core."[3] If the shock is not so severe, the remaining vital motions may prevail, allay the tumult, restore orderly motion, and rekindle sensation.[4] If life continues as long as certain atoms communicate their movement to each other, and ceases when this motion is destroyed, life must be nothing more or less than some specific motion of the atoms.

Since atomic motion is, according to Lucretius, the only ultimate form of energy, life is one manifestation of the energy of the universe. That life is such is denied by Sir Oliver Lodge, although there are those who hold the opposite opinion.[5]

Perhaps few poets have depicted life in a more vivid manner than has Lucretius. Many of his expres-

1. This is Mr. Masson's definition. 2. III, 335 - 6.
3. II, 944 - 8. 4. II, 954 - 9. 5. "Life and Matter," p. 18.

sions cannot be forgotten. The trees, with energy unbridled, run a race as they climb upward into the air. The frisky young of the herds disport themselves in the meadows utterly intoxicated with the joy of living. With this Lucretius's theory of the origin of life is in strange contrast. However, in view of the state of scientific knowledge in his time, it is not strange that he makes so slight an attempt to bridge the chasm between dead atoms and living creatures. Lucretius undoubtedly has complete faith in the sufficiency of his theory. He says, "manifest facts ------ lead you by the hand and compel you to believe," and an opposing theory he frequently characterizes with the words, "perridiculum esse videtur," while the reader is kept from a sceptical view of the poet's doctrines by the warning, "Id licet hinc quamvis hebeti cognoscere corde."

By making the atoms which produce life as fine as possible, Lucretius no doubt thinks to solve the difficulty. This concept of matter practically dematerialized will be found again in connection with the

Soul. This extreme refinement of matter simply pushes the inexplicable one step farther back. The whole question involves great difficulties.

Darwin postulates one living form amid a world of dead matter and conceives of this form as capable of developing into higher types. The origin of this first living form materialists do not explain. Others postulate all matter as living and able to evolve all living forms. Whence came these powers of development, materialists do not tell us. If we try to account for consciousness by beginning with atoms endowed with sensation, the question arises as to how a number of discrete sensations can be combined into one consciousness. In discussing this question, Professor Veitch says,[1] "The theory of the aggregation of sensations through association, supposes a continuous unity and identity of mind or consciousness for which we have no equivalent in any sensation. In a word, Kant's position that category or thought is needed for the intelligibility and the existence of sensation is irrefrangible." Moreover Professor

1. "The Atomic Theory of Lucretius," p. 88.

Wm. James adds testimony in speaking of Clifford's Theory of Mind-Stuff:[1]

"No possible number of entities (call them as you like, whether forces, material particles, or mental elements) can sum themselves together. Each remains in the sum what it always was; and the sum itself exists only for a bystander who happens to overlook the units and apprehend the sum as such."

When absolutely dead matter, without a single living cell is taken as a basis for scientific reasoning, the problem is even more difficult.

There is, however, another theory that has been brought forward by materialists in explanation of the origin of life. This is the power of carbon and of some other non-elementary bodies such as water, of linking to themselves not only atoms of the same substance, but also of others into an exceedingly large and complex molecule. Sir Oliver Lodge tells us that if such a molecule gathers to itself others until there results a molecule containing millions or billions of

1. "Principles of Psychology," Vol., I, 158 - 9.

atoms, new properties may be expected to appear, as for instance a million earths aggregated together would acquire the property of radio-activity, would become self-heating and self-luminous, would in fact be a sun.[1]

Likewise such an unstable aggregation of matter might serve as the vehicle of influences wholly unexpected, e. g. of life. He says it is extremely improbable that such an aggregation can generate life. All that has been verified is that a "complex molecular aggregate is capable of being the vehicle or material basis of life."

When scientists of the present day tell us that "life may be something not only ultra-terrestrial, but even immaterial, something outside our present categories of matter and energy,"[2] Lucretius should not be harshly judged for the futility of his explanation.

The object he has in view is to dispense with the gods. He believes that the three infinities of space, atoms, and time enable him to do so. For him, an infinite number of atoms attempting numberless com-

1. "Life and Matter," p. 157 - 171.
2. "Life and Matter," p. 173.

binations through countless ages, can replace creation ordered by a divine intelligence.

V. The Nature and Functions of the Soul.

The general character of the Lucretian theory of the soul is determined by the fact that Materialism reduces everything to complexes of atoms and all action to their motions. The application of this principle to life has been noted; its bearing upon the nature of the soul remains to be examined.

The term soul includes the principle of life and all those operations which are recognized today as functions of the brain and nervous system. In this connection, one must remember that the ancients knew nothing of the structure and use of the nervous system.

Lucretius's first statement is that the soul is not a harmony between the various parts of the body or, to state the idea more clearly, it is not the result of a given state of body.[1] It is an actual part of a man, a genuine constituent of bodily life, an organ just as much as the limbs.[2]

Entirely in harmony with this view, is the

1. III, 94 -97. 2. 130 - 132

statement that the soul is of a corporeal nature.[1] Lucretius tries to prove that the soul is material by the fact that it moves the body, rouses it from sleep, controls the facial expression, and is, in turn, affected by injuries to the body. None of these interactions could occur without the actual contact of soul and body.[2] If we admit the fundamental materialistic principle that nothing can be conceived of as incorporeal except Void, but that Void cannot be either active or passive, we are obliged to accept Lucretius's theory and say that since the soul acts and is acted upon, it must be of a material nature.

Lange says that to materialists of the present time, this theory of the soul as consisting of matter would be most repugnant. Ignorance of nerve force and the functions of the brain made the belief acceptable to the ancients.

Soul and body interact because the union of the two is so complete. They are intricately interwoven with each other;[3] the mind suffers many ills because of

1. 161 - 4. 2. 165 - 6.

3. 739 - 40.

its close connection with the body.[1] The soul substance is received from the parents' souls, and it grows along with the body.[2] Through their association from the beginning of their existence, body and soul are enabled to work in harmony[3] and the latter is able to permeate the former and grow in the very blood and bones, instead of occupying a special compartment of its own as would be the case, were it inserted in the body at birth[4]. Joint partners in life, the two are mutually dependent.[5] It is as impossible to separate the soul from the body without destroying the latter, as it is to remove the fragrance from a lump of frankincense.[6] Neither apart from the other seems capable of sensation, but sensation is kindled and blown into flame throughout the body by the common atomic motions of the body and soul.[7] During life, the body enjoys sensation because of the presence of the soul, but it loses this property at death, because sensation, while inherent in the soul, is only an accident of the body.[8]

The soul is corporeal but its material substance

1. III. 734. 2. 337, 445 - 6, 746 - 7. 3. 344.
4. 683 - 5. 5. 332. 6. 327 - 30.
7. 333 - 36. 8. 350 - 58.

must be of a kind to explain its peculiar nature. This, according to Lucretius and his predecessors of the atomistic school, lies in its animating and motive force. The soul is that which effects the movement, sensation, and thought of living beings, but to do this it must itself, be in constant motion. Mechanical motion, the only kind recognized by Lucretius, can be produced only by what is moved. Hence the mobility ascribed to the soul atoms.

From the speed of thought[1], and the fact that the soulless body is as heavy as the living one[2], Lucretius draws the inference that the soul atoms must be exceedingly minute, round and smooth.[3] The action of the mind is more rapid than that of anything else in nature[4]; therefore its atoms must be not only easily set in motion but also be unencumbered with hooks or any apparatus to impede their movements. Furthermore death takes away nothing except sensibility and the vital warmth;[5] hence the atoms of the vital principle must be exceedingly small and light in weight. The latter illustration, Lucretius elaborates by comparing the soul

1. III, 182 - 3. 2. 230. 3. 203 - 5.
4. 184 - 5. 5. 212 - 15.

with the bouquet of wine.[1] Each is atomic, but neither at its departure causes a perceptible diminution of substance. If the atoms of soul scattered throughout the body could be collected in one place, they would occupy an exceedingly minute portion of space[2].

It has been noted that large atoms supplied with hooks, which entangle neighboring elements, form solid, enduring substances such as iron or rock. At the opposite end of the graduation series stand the soul atoms. It is interesting to observe, in this connection, that Lucretius seems to assort the atoms into three classes according to size and shape. Large, intricately shaped atoms are the constituents of dead matter; those that are smaller and smoother are capable of composing organic matter; those that are perfectly spherical and most minute are the elements of soul.

Not only are the soul atoms smaller than those of the body but they are fewer in number.[3]

Democritus taught that atoms of soul and body alternate with each other[4], but Lucretius says that the

1. III. 231. 2. 208 - 10 4. 370 - 4
3. 374 - 7.

soul atoms are ~~distinguished~~ distributed at greater intervals than those of the body. His statement is as follows: "You may be able to avow that the atoms of soul have spaces between them proportionate to the size of the tiny bodies which, if thrown upon us, first excite sensation."[1] Lucretius here has the idea that not every minute area of the skin is sensitive, the result, we now know, of the fact that there is some distance between nerve endings. One does not feel minute particles of dust, or a spider web, or thistle down, or feathers, or the tread of an insect, because these objects do not touch atoms of the soul.[2] Giussani points out the fact that a thread of spider's web or a feather would, because of length, bridge the intervals between soul atoms and therefore arouse sensation, were those atoms at the surface. So it seems that the intervals are of profundity.[3] It is entirely possible, however, that a spider's web might because of its meshes touch only the interstices between soul atoms.

Lucretius continues, "It is necessary to arouse

1. 376 - 80. 2. 381 - 90. 3. Duff. p. 62.

many atoms (of body) in us before the atoms of soul, scattered throughout the frame in our bodies, perceive that atoms (of the body) have been struck and before they, being separate, are able to rush together and meet with repeated clashing and in turn to leap apart."[1] This seems to indicate that a considerable shock is needed to reach the soul atoms and that furthermore a number of these must be aroused in order for them to encounter each other and thus transmit sensation.

This is where the smoothness of the soul atoms is of great importance. Smooth elements are not subject to entanglement to such a degree as are those of rough or hooked surface and hence can oscillate through a longer distance.[2]

It should be noted that in the discussion of the soul atoms, Lucretius apparently confuses atoms and molecules. Unless one makes the distinction, much of what is said about the cause of sensation seems contradictory to the fundamental propositions of the kinetics of the atom.

1. 391 - 5. 2. II, 100 - 108.

In connection with the distribution of soul atoms, it would be somewhat difficult for Lucretius to explain why these are apparently closer together or nearer the surface at the finger tips for instance, since he maintains that the various organs were not made to perform a specific function, but that the use was found for the organ.[1]

The nature of the soul is, according to Lucretius, twofold. It consists of the rational soul or Animus and the irrational soul or Anima.

Throughout his treatment of psychology, Lucretius wrestles with a difficulty of terminology. In the Greek, ψυχή is divided into τὸ λόγον ἔχον and τὸ ἄλογον but the Latin knows no such distinction. Hence Lucritius is compelled to divide the anima or whole soul into animus and anima. This lack of suitable terms results in a certain amount of ambiguity, which renders still more arduous the elucidation of an already sufficiently difficult portion of the poem.

In this discussion, the term soul, will be used

1. IV, 822 - 842.

to cover both the rational and irrational soul, and the latter terms will be expressed, for the sake of brevity and clearness, by the Latin words.

Nowhere does Lucretius speak of the animus and anima as partes animae. He insists that they are indissolubly connected with each other and make up one nature.[1] The extant writings of Epicurus say nothing of this division, but, from the fact that the Roman poet follows his master faithfully in other particulars, we may feel certain that the latter discriminated between the two. Epicurus may have adopted this portion of his theory from the works of Plato and Aristotle.

Such a division of the soul's functions harmonizes with Epicurus's use of sense perception as the criterion of truth.[2] The material soul must be extended and therefore must have a location. Joy, sorrow, and fear all affect the beating of the heart; hence the animus is located in the heart.[3] Moreover a snake's tail[4] or a severed limb continues to quiver for a time,[5] so the vital principle or anima is distributed through-

1. III, 136 - 7, 398 - 9. 2. IV, 478 - 9.
3. III, 140 - 2. 4. 657 - 665. 5. 653.

out the body.[1] Of the two functional divisions of the soul, the animus is the superior[2]. It is the seat of the reason, the will, and the emotions.

The words animus and mens are often used synonymously by Lucretius, but the former is really the broader term, mens being restricted to the purely intellectual side of the animus.

The power of intellection belongs to the rational soul exclusively. Lucretius calls it 'the power of reason that directs the life.'[3] It is the head and reigns supreme in the whole body. 'It alone has the power of reason' (idque sibi solum per se sapit).[4] It alone can initiate voluntary action[5] or resist compulsion[6], for in it the will resides[7]. A mental process must precede every voluntary[8] action for 'no-one begins to do anything before the mind sees in anticipation that which it wishes.'[9] Again 'nothing is seen to be done with such swiftness as the mind forms a concept of the action and, itself, begins it.'[10]

In addition, the animus is the seat of the

1. III , 143. 2. III , 138. 3, 94 - 95.
4. 145. 5. 143 - 4; II, 259 - 60. 6. 277 - 83.
7. II, 265, 268 - 9. 8. III , 144. 9. IV, 883-4
10. III, 182-3.

emotions.[1] If not very intense, the feeling of joy, sorrow, fear or what not, may be confined to the animus[2] but, if sufficiently violent, the anima participates in the disturbance, as is shown by the fact that the symptoms such as pallor, perspiration, or faintness, are not restricted to the breast.[3]

The anima is subordinate to the animus[4]. Like the latter, it is an organ of the body. One of its chief functions is to convey sensation and consequently life to the body. During life, the body has sensation because of the presence of the anima[5]. This function is also illustrated where portions of the anima are rent to pieces successively and in consequence a man dies by inches.[6] Another highly important office is to convey the motion of the will to the body and enable the body to act in accordance with the volition.[7] Thus the anima performs the work of the efferent nerves.

Of the two, the animus is more necessary to life than the anima[8]. The latter may be almost entirely lost when the limbs are shorn from the body, but if the

1. III , 141-2. 2. III, 149 - 51. 3. 149 - 58
4. 143 - 4. 5. 350 - 9. 6. 607 - 12.
7. 144. 8. 396 - 7.

animus is lost, death ensues.

The distinction between the functions of the animus and the anima may be compared with the modern psychological distinction between consciousness and subconsciousness. Professor Stout says that if we analyze our total experience at any moment, we shall find in it material which is not at the moment contributing to the cognitive function of consciousness. Those modifications of consciousness which are capable of fulfilling the function of presentation may exist even when they are not the means of cognizing objects. They may exist as possible material for discriminative thinking without being utilized to the full extent. At any moment, the thought-discrimination does not keep pace with the differentiation of the sensory data supplied. To make any one of these the object of thought would require a long series of successive acts of attention.[1]

In general, it is the function of the animus to think and that of the anima to gather the material for thought for it is the anima that is present in the

1. Stout, "Manual of Psychology," 69.

sense organs. Lucretius thinks of each of the functional divisions of the soul as capable of at least semi-independent operation.[1] The eye itself sees[2] the stimulation occuring in the atoms of anima, and Lucretius says that if one does not pay attention, it is just as though there were nothing in the field of vision.[3] Furthermore the animus may be so engrossed with a train of thought that it fails to notice the sensations received by the anima. This point Lucretius illustrates by the statement that a soldier intent on battle aftem does not notice for some time that he has been wounded[4]. The impressions made on the anima could be raised from the realm of the sub-conscious only by the attention.

The mode of operation of the rational and irrational soul must be treated later under the "Theory of Emanations."

Various views concerning the nature of the soul obtained before the time of Epicurus. Aristotle tells us that those thinkers who laid stress on the soul's knowledge and perception of all that exists, identified

1. III, 114-5, 145 - 151. 2. III, 359 - 62.
3. IV, 811 - 13. 4. III, 642 - 653.

the soul with the ultimate particles whether they recognized a plurality of these or not[1]. Thus Anaximenes thought that the soul consists of "air", the term at that time meaning water in a vaporous state[2]. Empedocles compounded the soul out of all the elements, i.e. earth, air, fire, and water, while at the same time regarding each as a soul. Heraclitus and Democritus taught that the soul is of the nature of fire.[1] Diogenes of Apollonia maintained that warm, dry air constituted the soul[1]; Hippo asserted the soul to be water;[1] others like Critias believed it to be blood.[1] In fact each of the four elements recognized by Empedocles and Aristotle except earth found its supporter as the material of the soul.[1]

Of all these theories that of Diogenes of Apollonia and - to a slighter degree - that of Anaximenes most resemble the belief of Epicurus and his disciple.

In the Lucretian theory the soul is a compound substance composed of four ingredients;[1] aura or ventus; air in motion; vapor or calor heat; aër, calm air; and

1. "De Anima", I, 2.

2. Burnet, "Early Greek Philosophy," 78

a fourth constituent that is nameless[1].

The idea that the soul is partially made up of air and heat possibly originated in the observation of the cessation of respiration and the loss of the vital warmth at death. Lucretius's own statement that when death occurs, air is exhaled through the mouth and heat is given off in all directions seems to indicate this[2], for in this passage he is giving a general idea of the soul's composition. Things obvious to the senses are to Epicurus the foundation of all knowledge and the final court of appeal in the search for truth.

According to Lucretius, air is not a simple substance but is composed of, or rather contains, atoms given off in the wasting away of all substances.[3] Between aër and Ventus, there seem to be two or three differences. Aër is air at rest[4] and ventus, air in motion for Lucretius defines wind as air thoroughly agitated.[5] Moreover, ventus is cold[6] for it causes the chill of fear; Calor causes the heat of anger[7]; aer belongs to an equable disposition[8]. From this

1. 232 - 42. 2. 121 - 3. 3. V,273 - 80.
4. III, 302. 5. VI, 685. 6. III, 290,299,300.
7. III, 294. 8. III. 292 - 3, 302.

Giussani draws the conclusion that aër is lukewarm.[1] Ventus may have some other distinguishing feature not described in the Latin, for Epicurus calls it in Greek, something very like wind. There is indication, too, that these three substances differ in the size of their atoms.

Lucretius says that these three ingredients are not sufficient to create sensation, so it is necessary to ascribe to the soul a fourth substance[2]. This is nameless, apparently, because there is nothing in nature analogous to it.[3] It consists of the smallest and smoothest atoms and is the most mobile and subtle of all existing things.[4]

We have seen above that the soul substance must be adapted to its functions. Sensation is motion of the atoms; so also is thought, Hence the substance, which initiates the atomic movement that constitutes sensation and thought, is assumed to be exceedingly subtle; The fact that the Epicureans postulate a fourth substance seems to indicate a partial realization of the greatest

1. Giussani, "Studi Lucreziani," 184.
2. III, 238, 42. 3. 242. 4. 243 - 4

weakness of Materialism. Someone has remarked that nothing is gained by introducing the indefinable to elucidate the inexplicable.

Possibly matter thus refined seemed to the ancient mind much like spirit; probably a highly complex composition was thought to increase the capabilities of the soul, for Lucretius says that there is nothing in nature that consists of a single type of atoms and the more powers and properties a thing possesses, the more various must be the shapes of its atoms[1].

Every sensation and every mental process begins with the fourth substance as a mode of motion of its atoms.[2] How atomic motion is porpagated from this quartessence to the body is explained as follows[3]: "This (the quarta natura) begins the distribution throughout the body of sensation-causing motions, for it is the first to be stirred up, since it is composed of small atoms; thence heat receives the motion, then the unseen power of wind and then air; thence everything is set in motion, the blood is agitated, then every portion

1. II, 586 - 8. 2. III 246, 270-2
3. 245 - 251.

of the flesh thrills with sensation; finally, whether the sensation be pleasure or the opposite excitement, it is communicated to the bones and marrow last of all."

This is simply an application of the theory of the mounting upward of motion, described under the Kinetics of the Atom[1]. The motion begins with the smallest, most easily moved atoms. (This gives us reason to believe that there is a gradation in the size of the atoms of the first named three substances). After movement has reached the last element of soul, it is passed on first to the liquid blood, then to the soft flesh, and finally to the rigid bones and the marrow protected within them. Thus at length the whole frame is enabled to move.

The question of the location of the fourth substance is one of the most difficult in the entire poem.

The older commentators without exception confine the fourth substance to the animus. One of the passages chiefly responsible for this belief is the one in which Lucretius uses the same words in speaking of the quartessence that he employs elsewhere in

1. II, 132 - 141.

connection with the animus. In discussing the functions of the latter, he says "the mind reigns supreme in the whole body",[1] and, in his description of the fourth substance, he tells us that it is the very soul of the whole soul and reigns supreme throughout the whole body."[2] From this coincidence of expression, the inference was drawn that the quarta natura is either identical with the mens or exclusively confined to it.

Attention to the context of the second passage shows that Lucretius is trying to emphasize the tenuous nature of the quartessence. In so doing, he makes a comparison as follows:[3] Just as the atoms of the whole soul, because of their subtle nature, are hidden among the grosser elements of the body, so the atoms of the quarta natura, because so much finer than other soul atoms, are hidden within the other three ingredients. Therefore, quantitatively, the fourth substance is the soul of the whole soul. As the soul permeates the body, so the fourth substance permeates the soul. Furthermore it would not be in the manner of Lucretius to embody the thought that the quartessence belongs

1. III , 138. 2. 279 - 80. 3. 276 - 81.

exclusively to the animus in the middle of the paragraph in which he is explaining the intimate relationship of the four constituents of the soul.

Heinze and Giussani, working independently, both arrived at the conclusion that the fourth substance is shared by both the animus and the anima, the former containing a greater amount of it in proportion to the other ingredients than the latter.

There are a number of passages that can be addressed to substantiate this interpretation.

In the first place, Lucretius insists upon the close relationship of the four soul substances. They are 'mingled and united.'[1] 'The atoms (of the four components) run between each other with regular atomic movements so that no one element can be segregated or exercise its function if separated by space but they are, as it were, the several powers of one substance.'[2] Furthermore 'heat, calm air, the unseen power of wind, and that mobile essence ------- all these mingled together form one substance[1], just as warmth, odor, and

1. III, 258 - 9. 2. 262 - 5.

flavor combined enter into the composition of living flesh[1]. The emphasis upon unity of substance and the fact that local separation is impossible, point to the presence of all four ingredients in both animus and anima.

In the second place, Lucretius states that the first three substances are not sufficient for creating sensation.[2] Furthermore, every sensation begins with the quartessence.[3] Thence the motion that constitutes the sensation is transmitted to the other three in order, and thence to the body as we have seen above.[4]

Let us consider this statement in connection with two others. First of all sensation ends for the most part near the surface of the body.[5] This does not include the location of the animus which is situated within the breast. Secondly, and more important, sensation takes place not in the animus but in the organ.[6]

The eye is not a window through which the soul looks out, but the eye itself actually sees. There is absolutely nothing to indicate that the fourth substance in the animus is first aroused and that the sensation is,

1. 266 - 71. 2. III, 238. 3. 245-6, 270-2.
4. 247 - 51. 5. 256. 6. 359 - 369.

so to speak, telegraphed back to an organ. In fact, sensations may be aroused in any portion of the body without the mind taking any notice of it. Thus one intent upon battle, may continue to fight without noticing that his shield and left arm are missing or attempt to climb into a chariot after having lost a leg,[1] since the mind notices only what is the object of its attention.[2]

Therefore there must be atoms of the quart-essence in the various parts of the body to enable sensation to take place there. Then, too, the argument in refutation of Democritus's contention that atoms of soul are as numerous as those of body would be meaning-less if the fourth substance were not shared by the anima[3]. A light touch actually reaches atoms of soul, and, since all sensation must begin with the fourth substance, Lucretius must mean that atoms of the quartessence are touchedin the part where the sensation occurs.

Moreover, living creatures swarm in a dead body[4] being produced by spontaneous generation. Their bodies

1. 642 - 53. 2. IV, 811 - 813. 3. III 370-395.
4. 713 - 729.

apparently are formed from the disintegrating organic matter atoms and their souls from remnants of the soul that once inhabited the dead body. Atoms of the fourth substance must be present to enable the creature to live.

That the *animus* shares the other substances with the *anima*, Lucretius states quite clearly.[1]

The ultimate conclusion must be that the *animus* and *anima* are both composed of the four ingredients, but perhaps in differing proportions for the *animus*, being the seat of intellectual operations, probably contains a more dense array of atoms of the fourth substance to account for the rapidity of thought.

Lucretius'explanation of differences of temperament illustrates some of the changes of meaning through which the word 'temperament' has passed. The Latin *temperamentum* originally looked entirely to the physical composition of the body, and was a name for the various ratios between the elements of any structure. Yet the purely physical aspect never excluded the idea of character, which, though applicable to all things, tended to become restricted to psychical character.

1. 237, 288, 294 - 5, 299.

Aristotle along with the ancient art of medicine, derived physical and psychical characteristics from the mixture of the various constituents of the body, namely from heat and cold. We are told in the "De Anima" that the attributes of the soul, such as anger and fear, are inseparable from the physical matter of the animals to which they belong. For instance, anger would be defined by a physicist as a ferment of the blood or heat about the heart[1]. Epicurus was the first to take the step of setting up the ratio of the elements of the soul, instead of the ratio of the constituents of the body[2], as a measure for determining the temperaments and characters of men.

Lucretius teaches that calor, ventus, and aër are the determining factors in the character and the states of mind of both men and animals[3].

Apparently the three genera are mingled in such a way that one is concealed by another or is more prominent. Giussani thinks that just as the fourth substance is concealed by the grosser atoms of the other substance each of the latter is in turn hidden by the ingredient

1. "De Anima," I,1. 2. Heinze, Bush III, 89.

3. III. 288 - 318.

that is composed of larger atoms and so on in succession[1] calor by ventus and ventus by aër, according to the ascending scale spoken of in connection with the mounting upward of motion in the soul atoms.

However there is a possible change in the relationship of the atoms, depending not upon size, but apparently upon the influence exerted by any one kind. Lucretius says, "There is also that heat which the mind displays when it glows in wrath and when consuming fire flashes from the eyes. There is likewise much cold wind, the accompaniment of fear, which arouses a shuddering in the limbs and shakes the frame; there is also that state of quiet air which obtains when the breast is tranquil and the countenance serene." [2]

From Lucretius's statement, it is very difficult to determine what part the three ingredients play in the production of states of mind. One's first impression is that an increase in the number of atoms of any given substance produces a given state of mind, and one is more convinced of this after reading the passage on temperaments. However Heinze believes that the pre-

1. III, 283 - 7. 2. III, 288 - 93.

ponderance of any one constituent is the result and not the cause of a given state of mind, since all emotions must begin in the fourth substance.[1] According to his explanation, anger, arising in the fourth substance, would call into action heat in particular which would cause certain bodily symptoms; fear would affect the aura which would produce chills in the frame.

Not only may calor, ventus, and aër preponderate in specific states of mind. There are temperaments in which one is normally in the ascendancy. Calor causes or accompanies the leonine disposition, prone to anger;[2] ventus, the timidity so characteristic of deer;[3] aër, the placid, bovine disposition.[4] The same temperamental characteristics obtain among men also.[5] It is quite evident that Lucretius associates the qualities which he ascribes to the three genera, with the physiological and psychological manifestations in any state of mind or temperament. Heat is commonly associated with anger; cold and motion, the properties of wind, are well calculated to cause shuddering; tranquility and a moderate temper-

1. Bush III, 91. 2. III, 294 - 8.
3. 299 - 301. 4. 302 - 5. 5. 307.

ature, the qualities of aër, are suited to a state of calmness.

Lucretius furthermore gives us a single hint that minute differences of character depend upon the shapes of the soul atoms[1]. This portion of his theory he does not enlarge upon, because the poverty of his native tongue does not afford him names for all the various shapes of atoms.[2] Furthermore it does not suit his purpose to do so. The ethical conclusion is the important matter in Lucretius's estimation. His thought is that, whatever may be one's natural propensities, one can by the study of philosophy so nearly eradicate them that it will be possible to lead a life worthy of the gods,

"dignam dis degere vitam"[3]

The question at once arises as to how one could overcome his weaknesses, if the victim of anything so apparently unmanageable as the preponderance of atoms of a given shape. The answer probably lies in the existence of free-will, which depends upon the power of

1. 314 - 15. 2. 316 - 18

3. III. 319 - 22.

declination possessed by the soul atoms.[1] Free-will will be treated in the following chapter; it suffices at this point to note that in the Lucretian theory, man is not the slave of inexorable mechanical laws in the action of his mind. Therefore, if a man understands how he ought to live, he may be able to encourage desirable tendencies and to restrain those that should be checked. This apparently is the thought of Epicurus, for he says; "Let no one delay to study philosophy while he is young, and when he is old, let him not become weary of the study, for no man can ever find the time unsuitable or too late to study the health of his soul." [2]

1. II, 251 - 93. 2. Diogenes Laertius, X,XXVII, letter of Epicurus to Menoeceus.

VI. Declination and Free Will.

To the problem concerning the reasons for the relations of the phenomena in the world about us there are two solutions. The one ascribes all the phenomena of the universe to the caprice of one or more deities. The other ascribes everything to the operation of immutable laws.[1] In either case the lot of man is placed beyond his control.

Lucretius shows how man in his ignorance of the causes of movements of the heavenly bodies, of the change of season, and the like, ascribed these phenomena to the gods, and how superstitious fear reached its culmination in the thought that their power might be unlimited.[2] By his exposition of natural philosophy, Lucretius has removed the gods as a controlling influence in nature, but in so doing he has replaced a power which might be influenced by sacrifices by absolute Necessity. It is in the deliverance of man from Necessity, that the theory of atomic declination

1. M. Guyau, "La Morale d'Épicure," 60.
2. V, 1204 - 10.

finds its second application[1].

We have already seen how the slight swerving of the atoms at quite uncertain times and uncertain places rendered possible the combinations of atoms which ultimately resulted in the production of the world and all it contains. After explaining the bearing of declination on cosmogony, Lucretius accounts for Free Will in man.

Everything that occurs in Nature must be expressed in terms of the motion of atoms. Lucretius reasons that if any one motion must always be the result of an antecedent motion according to the laws of physics, there is no source from which one can derive the action of free will which implies in an individual a motion of the soul atoms over which the individual can exercise some control.[2] The solution of the difficulty lies in the ability of the atoms to swerve.

Lucretius is thoroughly convinced of the existence of free will. To prove his point, he appeals to personal experience and observation. He writes as follows:

1. II, 231 - 93. 2. II, 251 - 60.

"For beyond a doubt, the will of each individual makes for him a beginning and thence the motion is spread throughout the frame. For don't you see that at an instant when the barriers are thrown open, the eager energy of the horses can nevertheless not dash forth as suddenly as the mind itself desires. For the whole mass of matter throughout the entire body must be aroused so that, set in motion throughout the frame, it may follow with all its might the desire of the mind; so that you know that motion begins from the heart and that it first arises from the will of the mind when it is in turn distributed throughout the entire body. It is not the same when we go forward impelled by a blow of great violence from another and under great compulsion; for it is clear that then the entire mass of the whole body moves and is hurried along against our will until the will restrains it throughout the frame. Do you not see then that although an external force impels many people and compels them often to go forward and to be hurried headlong, there is nevertheless within our

breast something which is able to struggle and make resistance? According to the bidding of this also the mass of matter is compelled at times to turn its course throughout the body and, though forced on, is checked and subsides. For this reason in atoms likewise, you must admit that there is another cause of motion besides blows and weight, whence there is originated within us this power, since we see that nothing can be made from nothing; for weight forbids that everything should be done by blows as by an external force; but that the mind itself does not feel an outward compulsion in performing all its actions and be enthralled as it were and be compelled to bear and endure, this is caused by the exceedingly slight swerve of the primal elements at no certain place or fixed time."[1]

The illustrations of the action of the will in the initiation of movement and in the resistance of compulsory motion are very apt. Professor James says that the only ends which follow immediately on our willing seem to be movements of our own bodies. Whatever

1. II, 261 - 95.

feelings and havings we may will to get come in as results of preliminary movements which we make for the purpose .[1]

Lucretius considers the fact that no body begins to move at the instant the mind desires, a proof that the motion must have a small beginning. His idea is of the gradation of a force beginning with the smallest soul atoms, those of the fourth substance, and mounting upward by the communication of the motion to the larger atoms of soul and finally to the body according to his formula[2]. It is only after this process has been completed that a race horse, for instance can get under way.

When,on the other hand a body moves through the application of an outside force, the whole mass moves at once. Not only does the individual feel that compulsory motion is something altogether different from voluntary movement, but in the case of the former, the will finally comes into action and performs a function that is exactly the opposite of its office in the

1. "Principles of Psychology," Vol II, p. 486.
2. II, 133 - 141, and III, 246 - 51.

initiation of movement. Here again the motion has a small beginning and only gradually acquires enough force to counteract the momentum of the moving body.

Inasmuch as free-will occurs in man, Lucretius feels obliged to introduce something to account for it into the atoms, since "nothing can come from nothing." Whether the soul atoms move because of gravity or are moving because of the blows of other atoms, the movement is governed by the laws of mechanics. The swerve on the other hand is not so governed. The mind, to which free will has to be referred, is formulated in terms of atoms and its action in terms of atomic motion; therefore all that is necessary is that the motion of the atoms should not be fixed from all eternity. If motion is so fixed, the individual is the slave of the mechanical laws which govern the operations of his mind; if it is not so fixed, the activity of the individual is a real factor. This is the Epicurean view. Professor Brett points out the fact that before the ideas of God and the last judgment came in to produce a series of new problems,

the question of the freedom of the will was limited to the simple problem, 'Am I in my activity a real agent?'[1]

Since the time of Lucretius, a number of theories have been evolved which ascribe to matter the rudiments of consciousness and will. Gassendi believed that a weak form of consciousness exists in plants and even in inanimate matter, particularly in the magnet. A more recent development of this idea is Professor Clifford's theory of mind stuff, which maintains that mind is made up of mind atoms. This theory assumes that mental states are composite in structure, made up of smaller states conjoined. Both these theories ascribe to the individual constituent elements some measure of the power possessed by the whole.[2]

Lucretius certainly does not ascribe to the atoms even the rudiments of consciousness. His atoms are not only utterly dead, but also endowed with only those qualities without which matter would be unthinkable. Therefore it seems that one who assumes that the atoms are possessed of free will or even of anything

1. "The Philosophy of Gassendi," XXXI.
2. James, "Principles of Psychology," 145.

analogous to it, goes beyond the thought of Epicurus. The entire operation of the rational soul as of the irrational, is explained in terms of atomic motion. It would seem that the swerve is simply a mechanical device introduced to liberate the motion of the soul atoms from absolute fixity.

To ascribe to the atoms such a power as that of declination may be an apparent rather than a real contradiction to the laws of physics. Lotze, in discussing the mechanical theory of the evolution of worlds, allows to the elements an inner purposive activity which aids in the formation and preservation of things.[1] Varisco maintains that the whole world is composed of individual centres of spontaneity.[2]

Another point that should be noted in connection with this subject is the assumed power of the will to originate force.[3] The movement begins with the atoms of the fourth substance, atoms that are round, smooth, and far more tiny than any others, and hence that can be moved by the application of an exceedingly slight

1. "Microcosmus," 438.
2. "The Great Problems," 279 - 80
3. IV, 886 - 91, 898-906 and II 261-2.

force. Thence by the principle of the mounting upward of motion, upon which Lucretius lays so much stress, the will is enabled to move the body. The illustration of the manner in which the soul moves the body, where Lucretius likens the former to the helm that guides the huge bulk of a ship, or to the force applied through a system of pulleys, is more in harmony with mechanics than is the theory of the mounting upward of motion.[1]

In speaking of the conflict thought by many to exist between the laws of physics and the doctrine of free will, Sir Oliver Lodge says, "Life is something outside the scheme of mechanics - outside the categories of matter and energy; though it can nevertheless control or direct material forces, timing them and determining their point of application, subject always to the laws of energy and all other mechanical laws; supplementing or accompanying these laws, therefore, but contradicting or traversing them not a whit."[2] His contention is that whereas life or mind can neither generate energy nor directly exert force, yet it can cause matter to exert

3. "Life and Matter," 138.

force on matter, ans so can exercise guidance or control; it can prearrange the position of existing material and time the liberation of existing energy in any scene of activity, so as to produce certain desired results.[1] The difficulty of the question comes back to the origin of will. What starts the impulse is as yet unanswered, but that the problem is simplified by the fact that the work concomitants of the energy needed in the performance of any act are equally present, whether it be so arranged as to produce any predetermined effect or not[2].

The part played by atomic declination in the creation of the world and its bearing upon free will have been noted. In both its applications, this device seems simple, efficacious, and ingenious. It is, however, far more difficult to decide how far declination is manifested in Nature than to understand what it is intended to accomplish.

Apparently this power is conceived of as present in all atoms at the creation, and it is constantly being displayed in the action of the mind.

1. Ibid, 143. 2. Ibid, 147-8.

The problem that presents itself, then, concerns the continued manifestation or disappearance of declination in the world about.

One of the most remarkable answers to this question is that of M. Guyau.[1] His belief is that declination continues to manifest itself in Nature as "Spontaneity" in things. As manifested in the mind atoms the power to swerve results in freedom of the will;as revealed in the world of inanimate objects, it amounts to Chance. He combats the idea that the power of declination was ascribed to the atoms at the beginning and then withdrawn for, he says, Necessity would have clasped the universe afresh[2]. The continued manifestation of the ability of the atom to swerve is the only possible interpretation of the theory in the eyes of M. Guyau. After speaking of freedom of the will in man, he says, "The same power is found, as we have seen, in other living things (animantibus). Finally it is perhaps not foreign even to inorganic bodies or more or less to their primal elements"[3].

1. "La Morale d' Épicure," Chapitre II, "La Contingence dans la Nature, Condition de la Liberté Humaine."
2. p. 86. 3. "La Morale d' Epicure," 89 - 90.

Then he quotes the passage of Lucretius to the effect that to an observer heavy bodies do not seem to swerve in falling although one cannot implicitly trust his observation[1]. Instead of interpreting this statement as an illustration, by analogy, of the slightness of the swerve of the atoms, M. Guyau understands Lucretius to mean that heavy bodies may possess this power in some measure. He states his belief as follows:

"So, following this somewhat naive conception, even before our eyes, even in the midst of the coarsest aggregations of matter, spontaneity may yet have a place, if not in the mass, at least in the elements; it may even manifest itself by a movement real, though insensible, by a disturbance of which the effect will appear only in the course of time. Everywhere where atoms are found, in exterior objects as in us, there may be found the power more or less latent, of breaking necessity; and because outside the atom, there is nothing but void, nowhere will there reign an absolute and elementary necessity; the free will which man possesses will exist in all the elements of things, in a lower degree

1. II , 246 - 50.

but always ready to awaken, to act, if it encounters favorable combinations like those which result in a living being, an animal or a man."[1] This power, M. Guyau thinks, will always work in harmony with Nature and never against it. Furthermore, this theory provides for a wonderful solidarity between man and the world about him,[2] - the most striking and most original point in what M. Guyau deems to be the Epicurean theory of declination. The escape from necessity is shared by all nature.

A very detailed criticism of M. Guyau's theory is given by Mr. Masson[3]. He objects to the interpretation of the passage on the swerving of heavy bodies upon which M. Guyau's theory is very largely based. Furthermore, Spontaneity would be just as liable to work against nature as in harmony with it and it might easily result in a disruption of the laws of Nature. Such a power, by very slightly disturbing an equilibrium of forces, might result in tremendous consequences, such as the liberation of volcanic energy, or the start-

1. "La Morale d'Epicure," 90. 2. p. 98.

3. "Lucretius, Epicurean and Poet," Complementary Vol. 62-95.

ing of an avalanche. The idea that the results of Spontaneity would appear only after a long time, appears untenable to Mr. Masson. This author does not maintain that the power of declination absolutely passes out of existence. His explanation is that the soul atoms, or to be more explicit, the atoms of the fourth substance, because of their extreme lightness and mobility, continue to manifest this ability, whereas in aggregations of gross matter, the power is nullified, the swerving of one atom counteracting that of another.

One may find M. Guyau's theory of spontaneity untenable as an interpretation of the teachings of Epicurus and Lucretius, but philosophers of the present time hold a somewhat similar sort of view. This modern theory regards spontaneity as the condition or fundamental constituent of the reality of objects[1], and the whole world as composed of spontaneous centres of activity. Spontaneity is produced by necessity. If happenings are to take place, there must be absolute beginnings. Necessity does not determine the beginnings;

1. Varisco, "The Great Problems," 218.

what is necessarily determined cannot be a true beginning. Necessity determines that there must be beginnings; it determines the centres of spontaneity[1]. The centres of spontaneity are bound together by logical relations, but are nevertheless endowed with a certain independence. Spontaneity gives rise to a happening that is not the consequence of another happening. The determination of facts cannot be absolutely rigorous[2]. Varisco says, "There is in facts an element of determinism, logical relations, without which no causal connection would be possible. But there is also in facts a non-logical, indeterministic element - a spontaneity without which there would be no happening." [3] By this theory the individuality of things is enabled to escape general laws and every individual, so far as it is individual, is outside the reach of strict determination and is therefore quite forcibly self determined.[5] This individuality of things is identified with the source of life and movement.

Varisco shows how in inorganic bodies, the

1. Ibid., 239. 2. Ibid., 218.
3. Varisco, "The Great Problems," 247.

connection between the grouped centres of spontaneity is not of such a character that their spontaneities are excited either to become intensified or to express themselves in one way rather than another. Hence spontaneity is concealed and in purely physical happening, in so far as it is observable, there appears no certain sign of the elements of spontaneity which are included in it. The body as a whole lacks purposefulness.[1] On the other hand in an organism, the purposeful operations of the individual centres can interfere so that a purposeful variation of the system results from it.

The disappearance of spontaneity in the inorganic world and its pronounced activity in the organic corresponds somewhat closely to the interpretation of the Epicurean theory, according to which the power of declination is nullified in atoms which compose gross matter.

1. Ibid., 248.

VII. The Theory of Emanations.

Part I, Nature of the Emanations.

According to the theory of the atomists, all influence of one thing upon another is of a mechanical nature and consists of pressure and percussion; therefore any dynamical influence, though apparently produced from a distance, must be of a mechanical nature and caused by the actual contact of atoms. This is the reasoning that lies at the basis of the theory of emanations, which Epicurus borrowed from Empedocles. This hypothesis is, in many ways, equivalent to the modern theory of the interaction of bodies by means of ether vibrations.

The very extensive use, made of the doctrine of images or effluxes, not only in the explanation of of sense perception, but also of the higher intellectual processes, shows how completely psychology is a branch of physics in the Epicurean system.

Lucretius tells us that films or emanations are constantly being given off from the surface of all things.[1] These are something like a membrane or rind because they preserve the shape and appearance of the object from which they are thrown off. The proof used by Lucretius is an excellent illustration of the characteristically Epicurean method of reasoning from what is obvious to the senses to what is unknown, and is as follows: A number of visible objects display this power in a very tangible form. Wood emits smoke and fires, heat; cicadae and snakes shed their skins. If films of such gross texture can be thrown off, why is it not far more reasonable to believe that objects are able to give off those that are exceedingly delicate?[2]

Lucretius goes on to prove that such tenuous films emanate from things by the fact that when the sun shines upon the awning over a theatre, the seats and audience below are dyed with color.[3] Since the images reflected in water, a mirror or any other shining surface, have exactly the appearance of the objects them-

1. IV. 42 - 43. 2. IV. 54 - 66
3. 75 - 83.

selves, Lucretius concludes that the images must actually come from the objects[1].

Lucretius thinks that the atoms at the extreme surface of an object will not be impeded in detaching themselves from the body, as would those within, and will therefore withdraw, maintaining the same relative position that they had while a part of the object.[2]

The tenuous character of the films is illustrated by the fact that a single film would make no impression upon an organ of sense.[3] Only upon the eye of the soul, so to speak, could a single simulacrum make an impression[4]. There seem to be two classes of images, those that are thrown off from the surface of things and those that are formed spontaneously in the air.[5] The latter are combinations of the images of things actually existing[6]. No such creature as a Centaur ever existed, but one may see a Centaur in imagination, because the simulacrum of a horse may chance to combine with that of a man.[7] These films are less stable than the others and are comparable to the fantastic shapes sometimes assumed

1. IV 98 - 101. 2. 67 - 9. 3. 89, 105-6.
4. 89 - 101-2. 5. IV. 129-31. 6. 738.
7. 739 - 43.

by the clouds.[1]

The images fly about, passing through countless others, but they remain unharmed, until they meet with an obstacle. When they encounter substances such as glass, the pores of which are straight, they pass through unharmed;[2] but when the opposing object is like wood or stone, which have intricate passages between their atoms, the films are torn;[3] if the images strike against a mirror which is both dense and shining, they neither pass through nor are destroyed,[4] but are flattened out straight backward like a wet plaster mask dashed against a post,[5] that is they are reflected.

The velocity of images is enormous. There are a number of proofs of this. However quickly you place any object before a mirror, the image appears. This can be accomplished only by the image striking the mirror and rebounding.[6] Lucretius constantly appeals to mirror reflection in the course of his argument. Just as the sun must shed much light in an instant of time in order that all things may continually be full of it, so in a similar manner images must be carried

1. IV. 133 - 40. 2. 146-7, Reading vitrum instead of vestem , and 601-2.
3. 147-9. 4. 150-4.
5. 294-97. 6. 155-6.

off from objects in an instant of time, many in number, in many ways in all directions".[1] This is proved by turning a mirror which reflects the object from different angles, instantaneously.[2] One of the most conclusive proofs is the fact that as soon as one places a dish of water out of doors, the image of the heavens appears in the water. This, Lucretius thinks, is caused by an image which descends from the sky, and traverses an enormous distance in an instant of time.[3]

Besides these images which cause ocular vision, there are others of much finer texture[4], so tenuous that they can be perceived only by the eye of the soul[5]. Owing to their very subtle character, they are able to pass through the pores of the body and reach the <u>animus</u> within, thus producing thought as we shall see.[6]

Here a serious difficulty presents itself in regard to the composition of these very subtle films. Since we can think of any object, all things must give off films. The images which cause vision are, we suppose, composed of the ordinary atoms which make up the sub-

1. IV. 161-5. 2. 166-7. 3. IV. 211-15.
4. 728, 756. 5. 746 - 748. 6. 730 - 31.

stance. We know that rock and iron for instance, are composed of large, hooked atoms. How can such substances throw off exceedingly tenuous images? Any object that we think of, has the same attributes in our thought that it has when viewed by the eye. Therefore the atoms of the film which causes thought must be exactly similar in form, have the same arrangement, and be endowed with the same vibrations as the atoms of the image which affects the eye. No satisfactory explanation of the composition of the exceedingly subtle images is given. All that Lucretius tells us is that they are of finer texture than the others.

Furthermore, we are told that idols must either come from something existing, or be formed by the combination of two or more images of actual objects.[1] How can this be reconciled with the fact that one is able to think or dream of friends long since dead?

We never actually see those who are no longer living. This means that there are no longer a sufficient number of films, which emanated from them, to cause

1. IV. 129-32.

vision. For this a succession of images is necessary[1]. It is however, conceivable that a few images might perrish for a long period of time and might traverse great distances. A single such image could cause a thought or a dream.[2]

One of the greatest difficulties in the theory of images is the question of the motive force which enables the idols to move. Lucretius compares them to the light and heat of the sun which come from the interior of that body, but nevertheless travel with great velocity and he says that images which are very light and which come from the surface of things should travel still more rapidly.[3] Possibly he thinks of the images as borne on by the motion of their atoms.

Furthermore the images push the air before them instead of passing through it.[4] Masson thinks that their extreme velocity enables them to do this.

The theory of emanations is in harmony with Lucretius's statement that all things are losing a portion of their substance. This is illustrated by the

1. IV. 105-6. 2. 746-7. 3. IV. 185 - 208.
4. 246-7.

explanation of the composition of the air. This is said to be constantly receiving atoms given off from substances[1] and again the world as a whole is losing substance and will eventually pass away.[2]

It is interesting to note that Aristotle severely criticises Democritus in regard to the theory of effluxes. In the first place he objects to the reduction of all the sensations to touch,[3] and postulates instead of effluxes, a medium through which sensation can be caused[4]. Furthermore, to Aristotle, the idea that the shape of atoms can cause qualitative differences in sounds, colors, odors, and flavors seems absurd[5].

Much of the apparent absurdity of the theory of emanations has been removed by the discovery of radioactivity.

1. V. 273 - 80. 2. II. 1144 - 9. 3. "De Sensu," III.
4. Ibid. 5. "De Sensu," IV.

Part 2, Sense Perception.

In the psychology of Lucretius, the human intelligence is regarded as the complex product resulting from the sensations. Hence to sensation or the material for intellection, Lucretius devotes considerable attention. The processes of elaboration, he neglects almost entirely.

Lucretius makes more provision for the special sensations, those of the five senses, than for general ones, such as tingling, shivering and certain muscular sensations such as cramp. It is the special sensations that are ordinarily brought about by the action of external agents lying outside the organism, for which reason they are spoken of as sense-impressions and are peculiarly fitted to yield knowledge of the external world. According to our theory, these impressions lie at the basis of the intelligence.

Of the five senses, four only, sight, hearing, taste, and smell, are specifically discussed by Lucretius.

Touch, he scarcely mentions as such, apparently because he regards all the sensations as a species of touch.[1] Emanations from objects come in contrast with atoms of the fourth substance in the organ that is so constructed as to absorb and respond to the particular material constituents of the emanation. Each organ of sense has a special province of its own. In general there must be a certain strength of the impression, that is, a certain lower limit to the number of permeating atoms; in the case of sight, a succession of images[2], and the shape and size of the atoms must be such that they can gain admission to a special organ of sense.[3]

Lucretius's explanation of vision would be astounding, if we were to forget his fundamental materialistic principles. He begins his exposition as follows:[4] "Moreover since a shape handled in the darkness is recognized to be the same which is seen in the bright radience of light, tough and sight must be produced by a similar cause. Now, therefore, if we touch a square and it impresses us in the darknews, what square thing

1. II, 434 - 5.
2. IV, 89 and 257-8.
3. 489 - 95.
4. 230 - 6.

could impinge upon the sight except the image of it (of the square)?" Sight and touch, then, are caused in the same way, by actual contact with an object.

The emanations which preserve the shape and appearance of an object enter the eyes and cause vision; without them it would be impossible to see[1]. The idols not only enable one to see an object, but also to judge of its distance from the observer.[2] The image pushes before it the air intervening between it and the observer. This air passes through the eyes along with the idol and in so doing brushes the pupil. The latter enables one to see the object; the air, to judge the distance. The more air thus comes in contact with the eyes, the farther distant the object appears to be. One is inclined to ask what becomes of the enormous quantity of air and film atoms that pass into the eyes. Lucretius evidently thinks of all substances as more or less porous. The eyes are so and give a free egress to the atoms under ordinary conditions.[3]

1. IV. 238. 2. 344 - 255.

3. IV, 719-21.

Bright light causes a painful sensation because it contains atoms of fire.[1] The light of the sun cannot be looked at steadily because its idols gain momentum in falling toward the earth and therefore meet the eyes with considerable impact.[2] An emanation from the eyes may affect the incoming image, as in the case of jaundice, where atoms of yellowness meet with the idols and change the appearance of an object in respect to color.[3] The appearance of a distant object depends somewhat upon an alteration in the image in transmission. Thus a square tower, when viewed from a distance, appears to be round because the angles of the image are worn off by friction with the air.[4]

The other sensations, sound, taste, and smell, are caused by contact of certain atoms with the organs of sensation. Lucretius has a number of arguments to prove the corporeal nature of sound. The basic proof is, of course, the principle that whatever acts or is acted upon is material.[5] In the second place, sounds abrade the throat[6] and long continued discourse weakens the body

1. IV. 304-6. 2. 299 - 303. 3. 307 - 11
4. 353 - 361 5. 526 - 7. 6. IV. 528.

, by removing a portion of its substance.[1] Harshness or agreeableness of sound depends upon the shape of the atoms emitted.[2]

The tongue and lips render speech articulate so that if the distance between the speaker and the auditor is short, the thought is understood.[3] Passage through much air, however, renders the words confused.[4] One of the most peculiar ideas in connection with hearing is the statement that one utterance divides itself into many, the parts still remaining articulate. This is why any number of people can hear the same sound.[5]

We hear with the ears because they are the organs upon which the emanations, that we call sound, are able to produce an effect.

Taste is caused when, in mastication, one presses food with the tongue.[6] Atoms of flavor, as Lucretius says, pass through the pores of the loose-textured tongue and excite sensation,[7] - in the fourth substance of the anima.

If smooth atoms penetrate, the taste is agreeable;

1. IV, 535-40. 2. 531-41-46. 3. 547-56.
4. 557 - 62. 5. 563- 569. 6. 617-18.
7. 630-31.

if irregular or hooked atoms enter, the resulting sensation is disagreeable, the flavor being sharp or bitter.[1] Moreover, the same food may be pleasing to one individual and distasteful to another, while one man's meat may be another's poison.[2] The explanation given by Lucretius is as follows: 'The atomic composition of any two people is not exactly the same[3]; the difference in the composition of animals of different species must be much greater. If the atoms of the tongue and palate differ in shape and size, their paths of vibration and their motions must differ and consequently the interstices between them, which constitute the pores. These apertures are of various sizes and geometric figures in different individuals.[4] If a food has an agreeable flavor for a certain person or animal, this simply means that the openings of the tongue and palate are of such size and shapes that only the smooth, round atoms pass through.[5]

If the substance has a biting or bitter taste, the irregularly shaped atoms pass through and in so doing, lacerate the edges of the pores.[6] Furthermore, all

1. IV. 632-36. 2. 633-37. 3. IV. 645-48.
4. 649-57. 5. 658 - 60 6. 661 - 62.

substances contain variously shaped atoms. There is nothing that is not formed from a mingling of elements.[1] Even honey is not composed entirely of smooth and round atoms.[2] One individual may be fond of honey because his tongue and palate admit only the smooth atoms; another may find it disagreeable because his organ of taste admits the jagged elements likewise. This same theory explains why goats grow fat on hellebone, which is deadly to man,[3] and why food which is agreeable in health may be distasteful in illness, for disease disorders the arrangement of the atoms.[4]

Aside from the great difficulty that attends the explanation of all the sensations[5], there is another of minor importance. It is easy to see why large irregular atoms should be excluded from pores of certain shapes and sizes, but there seems to be no reason why small smooth atoms should not enter where large ones can. Possibly the explanation is that there is no substance of unalloyed bitterness.

Odor likewise consists of particles given off

1. II 383 - 84. 2. IV. 671-2. 3. 640 - 41.
4. 664 - 670 5. Vide infra.

from substances. The peculiar vocabulary Lucretius uses in speaking of odor, seems to indicate that he believed that the particles must be in a state of motion in order to be detected. He usesthe terms adiectus odoris, fluctus odorum, fluens, volvat, mitti and spargi. In this explanation Lucretius is correct.

Small, too, is a selective process. The agreeableness of an odor depends upon the shape of its component atoms, and their relation to the shape and size of the pores of the nostrils. The sense of smell enables each animal to find the food that is suitable for it.

Lucretius dwells at length upon the selective element in taste and smell and then says that the same is true of vision. Thus certain colors and objects offend the eyes of some animals. For instance a lion cannot endure the sight of a cock because there are in the latter atoms of such a character that they lacerate the eyes of the lion, while these same atoms do not offend human eyes, either because they do not enter or

or because their egress is not hindered.[1]

The explanation of the cause of sensation helps us to understand the functions of the anima. Whatever causes a sensation, whether it be a series of idols that strike the eye, or atoms of food in contact with the tongue, sets in motion the atoms of the fourth substance in the anima, and this motion is in turn conveyed to the other three ingredients in order and then to the organ.[2] The sensation is primarily a physiological process, but the animus in its central position is aware of the sensation unless its attention is fixed elsewhere[3], Hence the anima plays an important part in gathering material for the animus to elaborate, for we shall see that Lucretius regards sense perception as the basis of all knowledge.

A modern psychologist[4] says, "All intellectual activity is carried out upon and so involves sensations, that is, the psychological results of sensory stimulations, either in their original form as presentative elements, e.g., impressions of color, or as worked up into what

1. IV. 706 - 31.
2. III 246 - 8 and 359 - 61.
3. III. 642 - 53.
4. Sully, "Outlines of Psychology," p. 37.

are known as representations (images, ideas). Accordingly intellection may be said to be specially related to sensory processes.".

Part 3 - The Intellectual Processes.

Lucretius's treatment of the intellectual processes can scarcely be called a theory because of its meagreness. His purpose in treating psychology is to give a scientific explanation of dreams, visions, and all phenomena of a terrifying nature and to remove the fear of a future life by proving that the soul is mortal; not primarily to expound the operations of the mind.

Furthermore, we believe that Epicurus himself worked out no detailed theory. In speaking of the mind, he says, "We have still greater need of a correct notion of the whole than we have even of an accurate understanding of details;"[1] and again, "It is not good to desire what is impossible and to endeavor to enunciate a uniform theory about everything."[2]

However the master's discussion of the criteria of truth throws some light upon the teachings of the disciple. The ethical part of Epicurus's system affects

1. Diogenes Laertius, X, 24. Epicurus to Herodotus.
2. Diogenes Laertius, X, 25. Epicurus to Pythocles.

his logic as it does his physics. In seeking a speculative basis for a view of life that should refer everything to the feeling of pleasure or pain, Epicurus appeals to the sensations. The senses are the basis of all thought and to their testimony, the final appeal must be made in the search for truth. It is believed that Epicurus recognizes four tests of truth, the feelings, the perceptions, general notions or mental representations, and a second type, so to speak, of concept, more inclusive than the 'general notion' spoken of.[1]

When the animus takes cognizance of a sensation in any organ, we have a perception. From the repetition of a perception a concept arises.[2] These are mental pictures stored up in the memory. Epicurus says that "to enable one to affirm that what he sees in the distance is an ox, he must have a preconception or notion in his mind which makes him acquainted with the form of an ox. This preconception furnishes one with a certainty."[2] But the mind may pass beyond the known and

1. Diogenes Laertius, X, XX., Masson 251-2.
2. Diogenes Laertius, X, XXI.

try to realize the nature of things the evidence of which is not immediate.[1] This seems to be what is meant by the singular expression iniectus animi[2], a 'throwing on of the mind', to form a concept. Again Lucretius says that the animi iactus[3] flies on and tries to realize the nature of infinite space.[4] It appears that in this process of forming such a concept the reason plays an important part. For instance, the atoms which are intellectually conceived, have precisely the same qualities as the bodies which are sensibly perceived when we deduct from the latter all which can be shown to be the effect of a combination of circumstances. The intellect is only a subtler and more far reaching sense.[5]

A detailed discussion of the tests of truth is outside the plan of Lucretius's poem, but he does treat of the senses as the final court of appeal. He writes as follows: "Finally, if anyone thinks that nothing can be known, he does not know whether that also can be known, since he confesses that he knows nothing."[6]

1. Diogenes Laertius, X, 34. 2. II, 740.
3. II, 1047. 4. Masson, 252, Giussani, I, 271
5. Wallace, "Epicureanism," p.94. 6. IV, 469-70.

Obviously one holding such views can know nothing about the test of truth[1]. Then comes the statement that the concept of truth is created from the senses first of all and that the senses cannot be deceived[2]. Reason cannot be the criterion, for reason is founded on sense perception, and, if this is unreliable, the reasoning will not be valid[3]. Moreover, in the case of optical illusions, the vision is not at fault. When one is on a moving vessel the shore seems to be gliding by and the ship to be standing still[4]. To a child giddy from whirling about, the walls of the room seem to be revolving.[5] Yet the senses are not in the wrong[6] The mind is simply drawing an incorrect inference[7].

In all this, Lucretius is following very exactly the teachings of Epicurus.[8] Aristotle, too, recognized the perception of objects of the special senses as true or subject to a minimum of error.[9]

Lucretius treats of the mind as the organ of a sixth sense which, like the others that have been discussed, partakes of the nature of touch.

1. IV 475-6. 2. 478-9. 3. 485-
4. 387 ⊖ 90. 5. 401-3. 6. 435.
7. 464-8. 8. Diogenes Laertius X,XXIV,
9. "De Anima," III, 3.

In other words, the vision of the mind is a process entirely similar to that of the eye. On this point, Lucretius says,[1] "Now, therefore, since I have shown that I see a lion for instance, by means of images that impinge upon the eyes, one may know that the mind is aroused in a similar manner, which sees a lion and other things just as the eyes do, except that it discerns images that are more tenuous."

These exceedingly fine images have been mentioned Owing to the mobility of the atoms of the fourth substance, a single one of these simulacra penetrating to the animus, can arouse the atomic motion which constitutes thought.[2]

When one is awake, the images of surrounding objects cause the eye to see. The mind may pay attention to the vision of the eye and may think of what the eye sees. However one may pay no attention to one's surroundings,[3] and the far finer images may make an impression on the mind. Thus one may think of everything really existing or of a Centaur, a Scylla, or any

1. IV, 752-6. 2. IV, 746-8 and III, 246.
3. IV, 811-13.

other grotesque creature[1], simply because the images of several animals have become combined.[2] We never see such things with the eye because they do not exist[3] and what does not exist cannot throw off a succession of films to cause vision, but a single idol formed from the combinations of an image of a horse and of a man can enable the mind to see a Centaur in imagination.

During sleep, the functions of the anima are suspended[4], but those of the animus may continue, so that an individual dreams[5]. In his discussion of the operations of the mind, Lucretius lays great stress upon dreams, as Giussani says,[6] not for the sake of analogy, but because "dreaming is thought par excellence; it is thinking not obscured by sensation." Dreams are caused by images which penetrate to the mind.[7] Therefore dreaming is a natural and not a supernatural phenomenon.[8] In dreams one seems to see those that have long been dead, because the criteria of the senses cannot show the error and furthermore, the memory is not in operation.[9] Hence, while dreams are thought, Lucretius does not

1. IV. 731-3. 2. 741-3. 3. IV, 740.
4. III, 113-13. 5. III, 114-16 and IV, 758.
6. Vol. 3. p. 289. 7. 757-9. 8. 762. 9. 762-7.

ascribe to them any value in the recognition of the truth.

If in our thoughts or dreams, objects seem to m move, it is because a succession of images is supplied, each in a different position from the one before it[1]. The principle of the cinematograph is what Lucretius has in mind.

Our author asks a number of very difficult questions concerning the mental processes; some of them he does not answer, possibly because portions of the Fourth Book are in an unrevised condition. "Why", he asks, "does the mind think of whatever it desires?"[2] Why can we think of sea , earth, heavens, assemblies, pageants, banquets, or games, especially when others in the same vicinity are thinking of other things at the same moment?[3] Do we dream of a game because a number of idols have been taught to perform for our especial amusement?[4]

The last question is disregarded as absurd. Lucretius's explanation is as follows: "In any sensible

1. IV, 768-76. 2. 767-80. 3. 783-7.
4. 788-91.

period of time, let us say the length of time it takes to utter a single word, there are many rational divisions in which images may come to the mind. One of these, the mind of one individual selects; another person selects another. The tremendous number of images enables different people to entertain diverse thoughts.[1] The highly important question that is disregarded is why the mind accepts one image rather than another.

At this point Lucretius treats of attention. This is awakened by the initial image of any series that infringe upon the mind. "Because the images are so tenuous", Lucretius says, "the mind cannot see clearly any except those it strives to see: accordingly all images come to naught except those which the mind has prepared itself to see. It prepares itself moreover and expects to see what follows on each thing."[2] To prove the truth of his assertion, Lucretius appeals to experience and reminds us that the eyes do not perceive those objects that are almost invisible, un-

1. IV. 794-99. 2. IV. 802-6.

less they make an effort. Furthermore, if we do not fix the attention upon objects within our field of vision, it is as though they were not present. Therefore it is not surprising that the mind loses all the images outside the range of the attention at any given moment[1]. It is easy to understand why the mind should notice a succession of similar images if the attention were once fixed, but this brings us back to the selection of the initial image of a series. The importance of this question will appear later.

The initiation of an action, Lucretius goes on to explain, "I say that images of walking occur to the mind and strike it as I have said above. Thence arises the will. For no one begins to do anything before the mind sees in anticipation what it wishes. That which the mind sees in anticipation is the image of that act. Then, when the mind arouses itself to wish to step or advance, it immediately strikes the soul which is in the entire body, scattered through its members. That is easy for the mind to do since it is held closely

1. IV.807 - 15.

connected with the soul. Then that (the soul) in turn strikes the body and so gradually the whole mass is pushed forward and moved."[1]

It has been noted that the will resides in the fourth substance. This is the first constituent of the soul to be set in motion by an image.[2] The transmission of the motion of the movement of the atoms of the quartessence to the other ingredients of the soul and finally to the body is an application of the theory of the mounting upward of motion.[3] The process in this case begins as a psychical state and ends in the realm of physiology or perhaps more correctly, in that of mechanics.

However the important question from the point of view of the intellectual processes, is the rousing of the will. At first thought it would seem difficult to reconcile the freedom of the will with the chance arrival of an image.[4] Apparently the solution of the difficulty lies in the multiplicity of images by which we are constantly surrounded. Whether the mind chooses

1. IV, 881-92. 2. III, 246. 3. 246 - 50 and II, 133-41.
4. Masson, "Lucretius, Epicurean and Poet," 356.

to accept a certain image rather than another, or whether the mind chooses to respond to the suggestion of a certain image is not quite clear. If the latter is the case, freedom of the will can be displayed in the choice between two possible courses of action.

With the explanation of the action of the will, Lucretius's discussion of the operations of the mind is almost completed.

Let us grant for a moment the correctness of his beliefs and ascertain how far he goes toward covering the ground of psychology. Lucretius explains the structure and functions of the animus and anima[1], which correspond very roughly to the brain and nervous system. Sensation is discussed in some detail, but the reader is left to infer the connection between the sensation taking place in some organ and the animus. The formation of concepts by means of tenuous images is explained, but the iniectus animi or formation of the concept of something not evident to the senses, is passed over in silence. Reason and memory are merely mentioned. The attention receives some discussion, as

1.

has been noted above. Imaginative impressions are to be taken as literally impressions of images upon the mind, and therefore affects of material agencies and expressed in terms of atomic motion. There is a slight trace of a less materialistic view in the concession that the mind can reach out beyond the known. Temperaments and states of mind are treated together with the bearing upon them of heredity. Education, that is, the study of philosophy, is considered of great importance in overcoming undesirable propensities. How this is accomplished, we are not told. Instincts are merely mentioned.

The entire theory of images, including the mental phenomena based upon it, is beset with many difficulties. Those that concerned the production and kinetics of the idols have been mentioned.

In the first place it is difficult to understand how an image retaining the shape of the object from which it emanated, can enter the eye, still less the mind, since Lucretius tells us that if the images are torn or

even suffer a loss of sharpness of detail while passing through the air, we either do not see the object[3] or see it indistinctly.[1]

A question arises also in regard to the kind of images which arouse the Will. Lucretius speaks of 'idols of walking.' [2] Whether this means that an image of a walking individual catches the attention and conveys the idea of performing the same act, or that there are images not otherwise provided for in the theory, can not be determined.

The difficulty increases as one advances from the mental representation of concrete objects to the ideas of abstract qualities.

Furthermore, sensation and thought are all to be explained in terms of motion of the soul atoms according to the kinetic theory. Why a vibration of the atoms of anima caused in any organ by the impact of some particular type of atoms from an extraneous source, should be interpreted as sight and another vibration as hearing or taste is a difficult question. This question is not

1. IV. 356 - 61. 2. 881. 3. IV. 147-9.

settled even today in regard to the nervous system. Then, too, reasoning, memory, and the imaginative outbreaking of the mind are all modes of motion of the atoms of the animus. It would seem that these processes together with the analysis and synthesis involved, must be some secondary motion of the atoms, but the theory of kinetics makes no provision for such an explanation. Much has been said in criticism of the reduction of psychical processes to terms of modes of movement of material particles. However, Ostwald, in "Die Philosophie der Werte," expresses the belief that all psycho-physical energy can be reduced to the terms of psysico-chemical energy,-something in fact very like motion of the atoms.

Finally, when we speak of life and mind, we imply a continuity of consciousness. For instance, if perceptions are to be worked up into concepts there must be something to which to refer perceptions. The inability of Materialism to explain life and consciousness has been noted above. Here we may consider the

additional difficulty of joining consciousness to the flux of material atoms. In a lifetime an individual changes the atoms of his body several times. Why not those of his material soul also? Indeed Lucretius tells us that during ordinary sleep a portion of the soul atoms are lost[1]. This entire question is one of the most difficult in the Epicurean theory.

1. IV. 917.

Part 4, Sleep and Death.

The analogy between sleep and death has been widespread among peoples. The idea seems natural in the New Testament because of the belief in a reawakening. Vergil calls sleep the Twin Brother of Death[1], and Lucretius speaks of death as a'deep and eternal sleep.'[2] Furthermore the latter's explanations of the two phenomena are very similar so they may be treated together.

Sleep and death are both a part of the theory of emanations for they presuppose a loss of atoms.

Sleep occurs when a portion of the anima leaves the body and a portion condenses and withdraws into the depths of the frame.[3] Lucretius has previously told us that the loss of the anima means loss of sensation.[4] Conversely,a condition in which the body does not experience sensation indicates that the anima is not in operation.

The ordinary cause of sleep is respiration.[5]

1. Aeneid, VI, 278.
2. III, 465-6, 921.
3. IV, 916-18.
4. III, 356.
5. IV, 932-44.

Not only is the exterior of the body beaten at all times by the air, but the interior is also lashed because of the respiratory processes. This continuous buffeting disturbs the arrangements of the atoms of body and soul. The result is the departure of certain atoms of anima and the retirement of others, while still others are scattered far apart through the body.[1] Lucretius thinks of the soul as giving buoyancy to the body as the air floats the earth in the midst of space;[2] so the frame becomes inert and heavy [3]when the anima ceases to prop it up, so to speak.[4] Hence 'fit quasi paulatim nobis per membra ruina.'[5] The sleep that follows the taking of food or pronounced fatigue is the soundest because the digestive process or weariness greatly disturbs the atoms. The result is that a greater portion of the anima is ejected, some atoms retire more deeply into the body[6], probably into the bones or marrow as those parts are the most inaccessible to sensation[7], and the remainder is scattered more widely through the frame.

1. IV. 944-5. 2. 556-63. 3. III,113,1066.
4. IV, 950. 5. IV. 942. 6. 954-61.
7. III, 250-1.

The significance of this division of the *anima* is apparently the fact that it renders the distance between the atoms of soul so great that a rather violent vibration is necessary to enable them to touch each other and communicate the motion that causes sensation,[1]

Death is produced when the atoms of soul and body are so violently agitated that the atomic motion which constitutes life is impeded 'to the core'. The soul then dispenses through all the pores[2]. This is probably aided by the mobility of the soul atoms and by their lack of cohesion. The essential difference between sleep and death seems to be that in the latter not enough atoms of *anima* remain to rekindle sensation[3]. that is, if any of those atoms are left, and Lucretius thinks there are[4], the intervals between them are too great to allow the *sensiferi motus* to be communicated from one to another[5]. An injury to the *animus* is far more fatal than one to the *anima*[6]

At times while one is asleep, the animus is

1. III, 923-5. 2. II, 944-51. 3. III, 923-8.
4. III, 717-21. 5. 923-8 6. 396-7.

awake or partially so[1], and hence responds to the tenuous images floating about. The result is a dream. Sleep interferes with some of the operations of the mind, for memory is inactive[2]. Dreams very frequently reproduce the interests of one's waking hours. Lawyers plead cases[3], those who have attended the games day after day are once more in the amphitheatre[4], and Lucretius himself is trying to express in his native tongue his thoughts 'on nature'[5] This is because the paths before traversed by these images of things still lie open and admit the tenuous images in sleep[6].

In death on the other hand, the entire soul is disrupted so the Epicurean is never confronted by the awe-inspiring possibility 'to sleep,- perchance to dream!

The fact that the soul partially withdraws from the body seems to involve a difficulty in the awakening process. The departure of soul atoms in sleep is mentioned by Diogenes Laertius as an application of the theory that particles emanate from all bodies[7]. It

1. IV.114-16. 2. IV, 957-8. 3. 966
4. 973-83. 5. 969-70. 6. 976-7
7. Diogenes Laertius X, XXIV.

seems probable that Epicurus follows Democritus in the explanation of awakening, for he accepts his theory for the cause of sleep. Democritus sa ys that there is danger lest the soul atoms, because of their lightness, be forced out of the body. Inspiration affords protection against this danger in two ways: it introduces new soul substance and hinders by its counter current the soul atoms, which are within the body, from gaining egress. If the breath is impeded, the resistance is overcome and the soul atoms disperse[1].

In Democritus's theory, the air supplies the fiery matter out of which the soul is made. In the Lucretian belief, the air contains atoms of all substances[2] and hence can undoubtedly perform the same office. It is interesting to note that the words of Lucretius could very well apply to a soul composed of fire, for he frequently speaks of sensations and life being kindled into flame[3]. In fact ever since the time of Heraclitus there had been a distinct tendency to regard the soul as composed essentially of fire.

1. Zeller, "Pre-Socratic Philosophy," 359-60.
2. V, 273-80 3. IV, 925-8, II, 881-2, II, 943.

Heraclitus taught that the vitality of the soul and consequently its perfection, depends on its deriving its nourishment from the cosmic fire, and that one of the methods of obtaining this nourishment is sense perception, which is the absorption of the outer through the inner fire; this accounts for the depression of soul activity in sleep.[1]

Notwithstabding the similarity of the phenomena of sleep and death, there is still a great difference, for Lucretius says,

> "Nec quisquam expergitus exstat, frigida quem semel est vitai pausa secuta." [2]

1. Windelband, "History of Ancient Philosophy," 57.
2. III, 929-30

VIII. The Theory of Death.

The purpose of Lucretius's exposition of the nature of the Soul finds its fulfilment in the proof that

'Mortalem vitam mors ---inmortalis ademit.'[1]

The psychology, and indeed the whole system of physics, leads more or less directly to that end. After successfully combatting the fears that pertain to man's sojourn on earth, Lucretius proceeds to eradicate a fear that confronts all men, even those too ignorant to philosophize about the freedom of the will, - the fear of death.

The fact that Lucretius puts forth a tremendous effort to overcome the belief in immortality shows that he considered this idea not only very deeply rooted, but also the cause of much disquietude. It will be well to examine these two points.

There is an abundance of evidence to prove that the belief in immortality was very widespread in antiquity[2] and long before that, anthropologists tell us.[3] An examination of sepulchral inscriptions shows that the

1. III, 869.
2. Friedlander, "Roman Life and Manners," 385-6.
3. Marett, "Anthropology," 206.

number of epitaphs indicating a materialistic conception of the soul is exceedingly small in comparison with the thousands which reveal a strong faith in the future life. The practice of the cult of the dead and the belief in spirits are further proof.

Ideas on immortality were vague[1], but the popular belief on the whole in the Graeco-Roman world was still determined by the original Roman and Greek ideas of the future life. The prevailing conception was that of a more or less material existence, for the majority of men were not capable of exercising the faculty of abstraction required by the idea of a purely spiritual existence[2]. M. Guyau says that at death the individual lost everything and gained nothing. Death was the universal object of fear or rather one feared death less than the future life as represented by religion, for there had grown up a very tenacious association of ideas between the future life, the horror of the tomb, subterranean night and the phantoms with which the imagination is always inclined to people the night[3]. In comparison with this terrifying

1. Friedländer, "Roman Life and Manners," 292.
2. "Roman Life and Manners" 300.
3. "La Morale d'Épicure," 168.

prospect annihilation was preferable.

Lucretius makes no clear analysis of the factors which enter into the fear of death. Most of his emphasis falls upon the fear of the after life. He says, "That fear of Acheron must be driven out precipitately, which roils human life from its very foundations, suffusing everything with the sa ble hue of death and which leaves no pleasure pure and unmixed."[1] Men may boast that they believe the soul is mortal, but their conduct disproves their assertions, for they will endure exile and disgrace rather than seek death and thereby end their misery and, wherever they go, they sacrifice to the spirits of the dead and to the gods of the lower world, for in adversity the mask is snatched away and one's true self is revealed.[2] Lucretius even makes the fear of death the cause of all bad passions.[3] Avarice and excessive ambition, together with all kindred and resultant crimes, arise from man's struggle to secure the means wherewith to protect and prolong his life.

To deliver man from this fear, Lucretius employs

1. III, 37 - 40. 2. III, 39 - 58.

3. III, 59 - 86.

two methods. First he appeals to the reason by proving scientifically that the soul is mortal and therefore cannot suffer everlasting torments[1], and secondly he reasons with men in an attempt to reconcile them to the thoughts of death[2]. M. Guyau calls the Epicurean theory the most remarkable effort ever made to deliver the human soul from the fear of death[3].

The number of arguments in proof of the soul's mortality is placed by Mr. Munro at twenty-eight. The earlier arguments are directed against a future life.[4] To Lucretius, it is inconceivable to ascribe immortality to such a delicate fabric as the soul, especially since it develops with the body and is subject not only to maladies of its own, but also to diseases conveyed to it from the body. He adduces proof also that the soul is rent to pieces at death and hence cannot survive the body. The later arguments[5] refute the doctrine of preexistence held by the Platonists and Pythagoreans, who maintain that the life of the soul 'extends backwards into the infinite past as well as forwards into the endless future.'

1. III, 417 - 829. 2. III, 830 - 1094.
3. "La Morale d'Épicure," 104. 4. III, 425 - 669.
5. III, 670 - 783.

Granting that nothing exists but atoms and void, what we call a soul is a transitory phase in the flux of matter. Applied to such a soul, Lucretius's reasoning is absolutely conclusive.

Still the poet realizes that another element enters into the situation which cannot be removed by the cold, scientific reasoning just given. This is the instinctive shrinking from death, and, to reconcile man to meet the common fate, Lucretius devotes one of the noblest passages of his poem. Just as in times gone by we were not moved by the mightiest calamity that ever fell upon the Roman World, the second Punic War, so in the future it will not concern us if earth, sea, and sky are mingled in one common dissolution[1]. Birth gave us the power of feeling, but death removes it. The span of life is but a speck between two infinities.

One of the chief reasons why men shrink from death is that they project a conception of themselves as still living into the state beyond the grave. This

1. III. 832 - 42.

shows that they cannot apply their belief in the mortality of the soul.[1] A man imagines himself standing by and bemoaning the fate of his dead body which is being burned or lacerated by wild beasts.[2] The ideas of such an individual, Lucretius says, are doubly absurd for he imagines that he will have two selves, the one associated with the body, the other looking on, whereas his only self will cease to exist at the instant of death. Furthermore, people pity the dead because they are deprived of life's pleasures[3],- conduct that is unreasonable since the dead are deprived not only of the longing for pleasures but also of all sorrows[4].

The ethical system of Epicurus refers the good and evil of everything to feelings of pain and pleasure. Death is the deprivation of the power to feel; it is neither positive nor negative in its effect; it means utter insensibility, the only mean, as M. Guyau says, between pleasure and pain.[5]

A second cause of disquietude is <u>vitae cupido</u>[6] the insatiable desire to continue to live. For the

1. III, 873 - 5. 2. III, 870-87 3. III, 894-99
4. III, 900-5 5. "La Morale d'Épicure," 110.
6. III, 931-77

reproof of individuals unwilling to die, Lucretius introduces Nature, who argues in a tone that is coldly convincing rather than comforting. She tells men that if their lives have been wisely spent, they should rise as a guest who has eaten enough of life's banquet and with calmness of spirit, betake themselves to rest[1]. M. Guyau shows that this is the application of a philosophical principle of Epicurus to the effect that neither longer life nor immortality would increase one's happiness, for happiness is a complete whole sufficient in itself. What makes a difference in enjoyment is not its duration, but its intensity[2]. Furthermore, the desire to continue a misspent life is utter folly[3]. Finally, man must resign himself to the universal laws.[4] Matter is in a flux. "Some creatures are born, others die, and in a brief space of time the generations of living things are changed and like runners, hand on the torch of life." [5] Hence it is best to make a virtue of necessity and depart gracefully for,

"Life is given to none in fee simple, but to all as usufruct."[6]

1. 935-9. 2. "La Morale d'Épicure," 113.
3. III, 940-51. 4. III, 961-71. 5. II, 77 - 9.
6. III, 971.

L Lucretius turns aside for a moment to prove that men's passions are the only hell there is and that exists in this life[1]. Epicurean physics has enabled the poet to see beneath the earth and he has seen no Acheron.[2]. Tantalus is the man upon whom the wrath of the gods threatens to fall; Tityus is the individual whose heart is gnawed by passions; Sisyphus the disappointed politician; the slave of the Danaids, the insatiable soul; the instruments of torture are the stings of a guilty conscience. In addition to all this comes the awe-inspiring thought that these torments may be augmented beyond the grave.

"Hic Acherusia fit stultorum denique vita."[3]

The last argument in Lucretius's consolatio is the thought that since all the great and good have died, indluding the greatest of all philosophers, a poor insignificant creature whose life is worse than useless should be willing to die[4].

The only remedy for superstitious fears, attending either life on earth or the condition beyond the

1. III, 978 - 1023. 2. III, 25 - 7. 3. III. 1023.
4. III, 1024-52.

grave, is the philosophy of Epicurus.[1]

Lucretius has not completely analyzed the fear of death. M. Guyau, however, shows that it is not correct to confuse either the fear of the approach of death or the act of dying with the state of one no longer living[2]. This some critics have done. Epicurus considers that for one in life, death does not exist and for one in death, life does not exist. The pain of dying, "le mauvais quart d' heure" is susceptible to the same alleviation as other pains, the employment of courage.[3] Lucretius, it is true, deals with the love of life which is one of the positive elements which enters into the fear of death, but he fails to eradicate so strong an instinct. It may be that various misadventures have killed in Lucretius the desire to live. Another element is the dread of laying aside forever, one's affections, achievements, and hopes. The superstitious fears of death, arising from apprehensions of woes in a future life, Lucretius is successful in removing. The unwillingness to relinquish all that is most dear on earth

1. 1071 - 2. 2. "La Morale d' Épicure," 121 - 2.

he does not weaken. Cicero, in the "Dream of Scipio," bases his belief in immortality on the wonderful achievements of the human mind. Its powers, inventiveness and memory appear to him divine. This same belief has been confirmed by many peoples and Cicero's own arguments are repeated by theologians of the present day.

To ask man to abandon all hopes for the future in order to eradicate a fear which, to most people, is probably far less real than Lucretius imagines it, is to demand a tremendous sacrifice rather than to confer a benefit.

Conclusion.

Granted that all the absurdities and inexplicable features of the Epicurean physics are developed or find an application in the theory of the soul, the doctrine is nevertheless enobled by the purpose of Lucretius.

The conduct of the world has been removed from the caprice of Divine beings. With the poet, we are enabled to look beyond the "flaming walls of the world" and see the gods in calm repose, while Nature orders the affairs of the universe. Man's destiny has been wrested from the power of Necessity and placed in his own control. Death has been robbed of those terrors which pertain to an unfortunate future state. The majesty and earnestness of the diction and thought almost convince us and make us momentarily forget that the Epicurean creed compels man to renounce two of the beliefs most inherent in the race, the belief in God

and in the immortality of the soul.

Still, in view of the conditions surrounding life in the ancient world, particularly the popular religious beliefs, the teachings of Epicurus and his disciple must be regarded as constructive as well as destructive. Though one of the least elevated of the ancient systems of philosophy, Epicureanism has been almost glorified by the nobility of purpose, the sympathy, the tenderness of heart and the sincerity, as well as by the great poetic power which Lucretius devotes to the magnification of the dignity of Man and the effort to enable him to attain peace for his soul on earth. Withal, there is something profoundly appealing in the voice of the Roman poet, as it comes down through the centuries, indicating the path of life.

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